

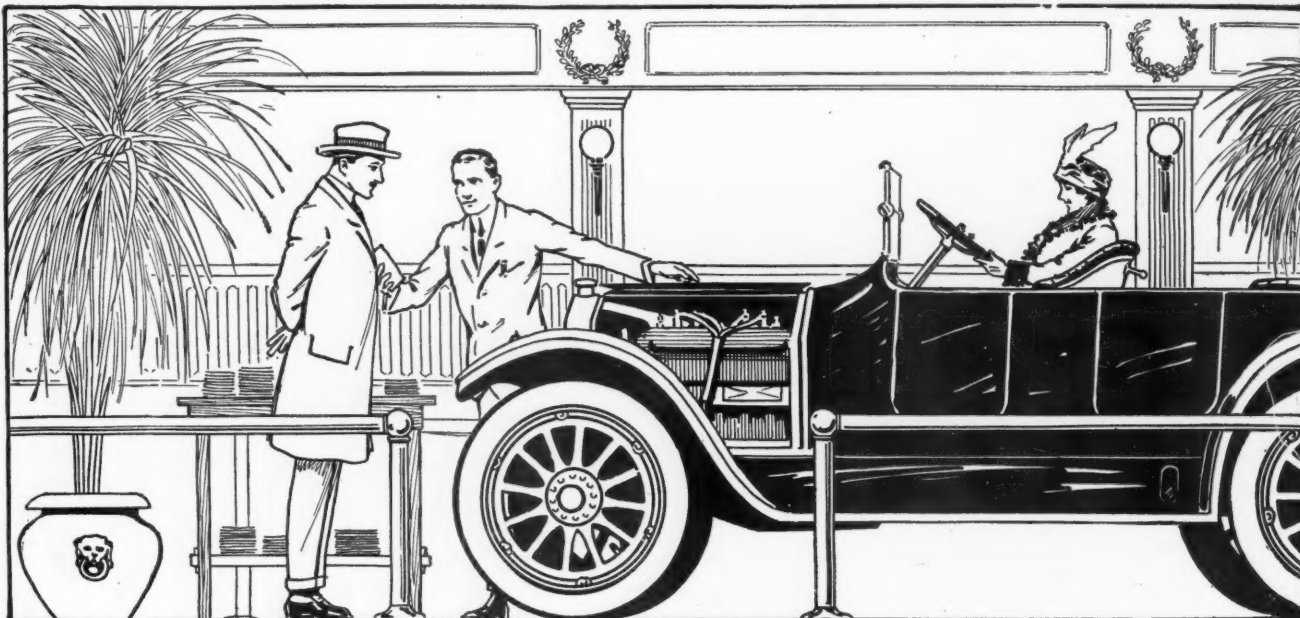
# MOTOR AGE



The STANDARD WELDING COMPANY

Pioneer and World's Largest Producers  
of Rims For Motor-Driven Vehicles

v. 27<sup>1</sup> Jan-Feb 1915



This salesman **knew his car** when he said, "And as further proof that the entire electrical system is absolutely right—notice the wire we use; it's

## *Packard* Protected Cable

This salesman had the right idea—he was selling **service**, which is a bigger thing than selling a car.

He knew what **real** service is—and the maker of that car knew, as proved by the use of Packard cable.

**Service first** is a good motto and good business.

Packard cable on a car is a mighty sure sign that the **whole car** is built for service—the one best way to build for sale.

Write for descriptive folder showing 28 standard styles in actual sizes and natural colors.



Combination High Tension Cable



Lighting Cable



Starting Cable

**The Packard Electric Company**  
Department C, **WARREN, OHIO**





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AUTOMOTIVE HISTORY COLLECTION

## Can you explain exactly why a bearing wears?

Everything, even solid-looking metal, is in reality composed of numberless tiny particles, invisible to the naked eye. Friction, which is essentially a pulling process (you can feel friction pull if you hold your hand around a rapidly revolving shaft) pulls the surface particles from their hold. This is "wear." You can see the particles that are worn from a piece of chalk, when you write on a blackboard. You can't see the particles worn from a piece of bronze, but the process is the same.



## is the longest wearing bearing bronze

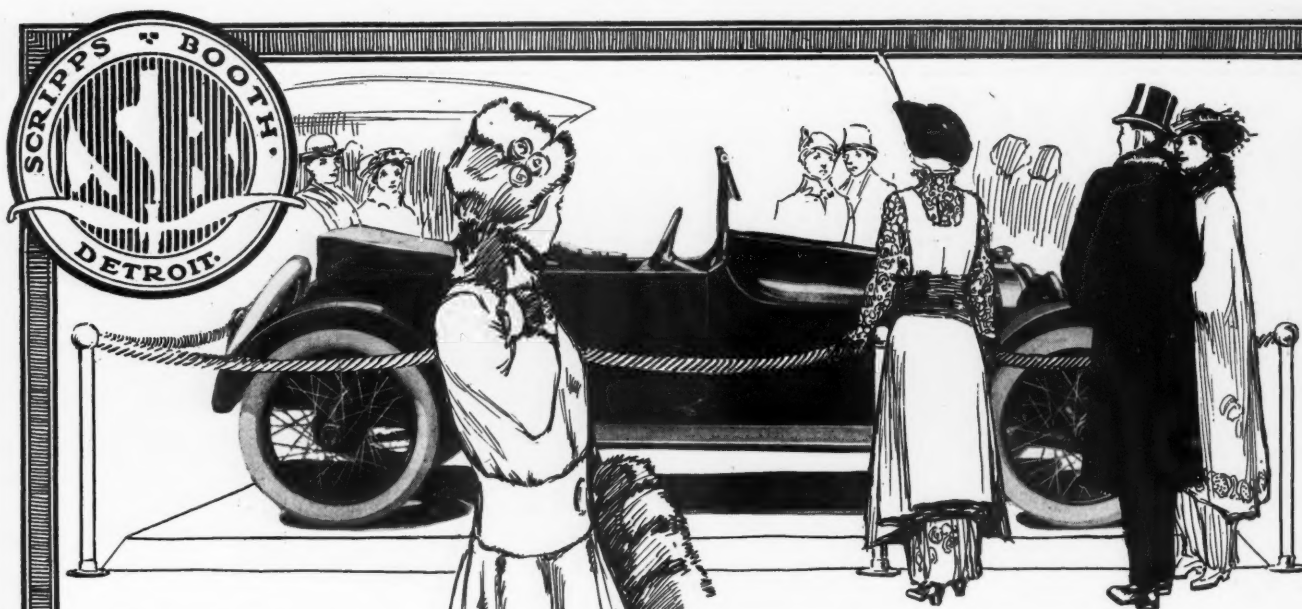
Because its particles are **interwoven** and locked together so that they **resist** frictional pull. It is because of this fibrous and interwoven structure of NON-GRAN that it wears twice as long as the best of all other bronzes, all of which are granular in structure.

There is the same difference between NON-GRAN and other bronzes as there is between a wood-block pavement and a gravel road. One is fibrous—the other granular. Just good common sense will tell you which wears the longer.

Don't fail to visit our booth at the Chicago Automobile Show. If you don't get there write us for full information.

**AMERICAN BRONZE COMPANY**  
Berwyn, Pennsylvania



**SPECIFICATIONS:**

110-inch wheelbase, three passenger car.

**MECHANISM**

Four-cylinder motor, three-speed gearset, shaft drive, bevel gear rear axle.

**EQUIPMENT**

Absolutely complete from electric self-starting and lighting system to electric door locks.

**FINISH**

Finest possible, both as regards upholstery, instruments, dash equipment and body finish.

**DETAILS**

Body—Streamline, torpedo stern, highest grade blue-black finish, domed fenders. Upholstery, finest quality long-grain buffed leather. Cowl dash instruments; sight feed oiler, lighting and dimming switches, starting strangler, starting and ignition switch, flush type speedometer, generator indicator, shroud light and foot space light.

**WHEELS**

Five Houk, triple-laced detachable wire, 30x3½ inches, wide hubs.

**AXLE**

Rear, full-floating, annular bearings throughout. Bevel drive. Ball bearing universal joints on the Kardan shaft. All gears and shafts 3½% nickel steel. Drive shaft tubular.

**MOTOR**

Sterling, valve-in-head type, high speed, gearset in unit, pump feed oiling with sight feed on dash, 2⅞ bore, 4-inch stroke, four-cylinder, water cooled. Develops 18 horsepower. Fitted with Zenith carburetor and Atwater-Kent automatic spark advance, connected with starter generator system.

**STARTING**

Bijur single unit electric, connected by silent chain, operated by locking dash switch.

**S H O W S**

The annual motor car exhibits are intended as a display of the year's progress in automobile building.

This year marks the first entry of light weight as a chief design factor in cars of extreme luxury and quality.

SCRIPPS-BOOTH luxurious light cars are the epitome of motor car improvement for 1915, and express in line, mechanism and luxury of appointment, the final climax of motor car luxury up to the very date of opening of the national shows.

The display of SCRIPPS-BOOTH cars at New York and Chicago will set a better standard of luxurious motor car building than has heretofore been seen in any automobile exhibition in America.

**S P E C I F I C A T I O N S :****SPRINGS**

Front, semi-elliptic with over-slung frame. Rear, floating cantilever.

**EQUIPMENT**

Silk mohair top with side curtains, rain vision plate glass windshield, electric door lock, Klaxet horn, full tool equipment, jack. Luggage space at the rear large enough for two suitcases and tools. Spare Houk wheel, tire and tube on all cars.

**FEATURES**

Klaxet button in center of steering wheel cannot be operated when ignition switch is off, eliminating miscellaneous horn blowing while the car is standing. No projecting handles or slots in the doors. Electric door locks are operated by pressing a small push button.

**SCRIPPS-BOOTH COMPANY, DETROIT, MICH.**





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Volume XXVII

January 7, 1915

No. 1

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In the next issue of Motor Age will appear the complete specifications of the American motor trucks.

## An Advertising Opportunity

At no time of the year is the automobile thrown more into the limelight than during the Automobile Shows. Advertise now while interest in motor cars and accessories is at white heat.

Right now thousands of motorists, who should be your customers, are gathering information to guide them in their spring purchases. Motor Age puts in excess of 23,000 little salesmen on the road every week. Let them help close this vast volume of business for you.

Take advantage of our big Chicago Show Issue of January 21st. Make your reservation for space now. Forms close January 18th. Remember in this issue you get a decided increase in circulation at no increase in advertising rate. Don't pass up one of the biggest advertising opportunities of the year.

If you haven't time to prepare copy yourself, let our Advertisers' Service Department assist you.

**MOTOR AGE**  
910 S. Michigan Ave., Chicago

## The Highest Tribute Ever Paid To a Starting-Lighting System

...the most  
...n-priced cars using this club  
...where cost is not an item.

### **Gray & Davis Equipment**

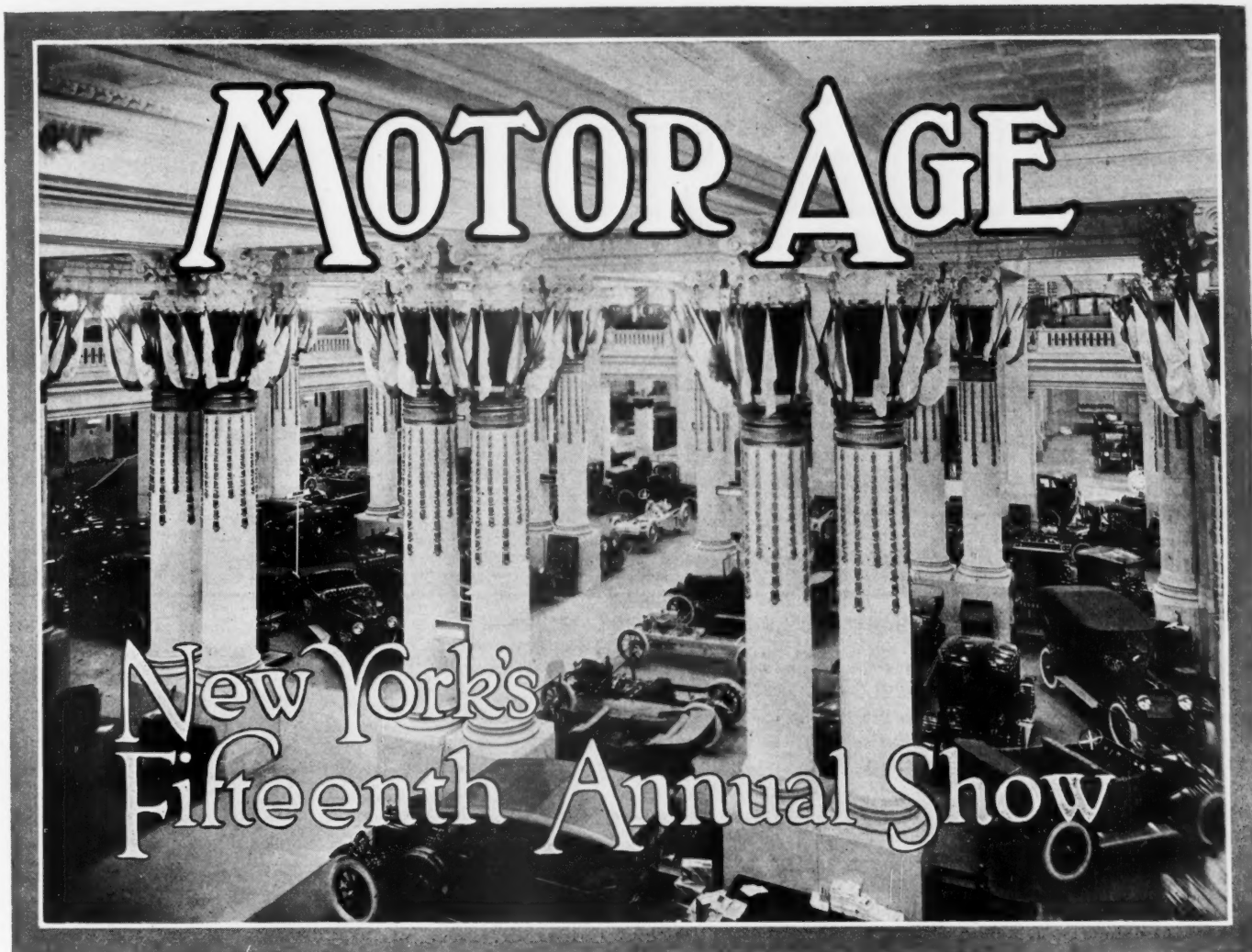
Practically all automobile engineers are unanimous in agreeing that the Gray & Davis separate unit electric starting and lighting system is the most perfect system on the market today. It has been used on the Paige for two years with wonderful results, and of course is retained on the new Paige "Six-46." It is the newest, lightest type, and turns over the motor faster than any other cranking system. found in this magnificent car think of them all together, "Six."

This is a reproduction of a recent PAIGE-DETROIT advertisement. It was written and inserted without our knowledge. The unbiased opinion of those who manufacture high-class automobiles is worthy of your utmost consideration and requires no comment.

*We Exhibit at the New York and Chicago Shows*

**GRAY & DAVIS, Inc.      Boston, Mass.**





**Three Hundred and Seventeen Exhibitors Pack Grand Central Palace—Great Interest Shown in the Eight-Cylinder—Several New Cars Announced—Feature of Accessories Display New Types of Electric Lighting and Cranking Outfits**

NEW YORK, Jan. 2—America had its first opportunity today to see the representative motor cars of the new season gathered together for inspection, and if the crowds that surged through the doors of the Grand Central Palace to witness the opening of the fifteenth annual national show is any criterion, a fairly large proportion of America intends to take advantage of it.

At 2 o'clock this afternoon the doors of the Palace were formally opened to display a massive and elaborate Persian palace in which were grouped the products of most of America's motor car manufacturers.

**Decorations Most Pleasing**

The unusual combination of the occident and orient thus provided was not at all inharmonious. S. A. Miles, under whose direct personal management the exhibition is staged, for the National Automobile Chamber of Commerce, had evolved a scheme of decoration which enhanced the beauty of the naturally beautiful Grand Central Palace and yet which did not clash with the motor cars themselves.

From the entrance there is a vista of tall marble columns crowned with gold ribbon and a corona of maroon, blue, yellow and white flags. From the balcony rose vines have been trailed and the massive chandeliers which form the chief means of central illumination are finished in gold, rose and white. The chief change in the exhibit spaces themselves consists of the signs by which the spaces are designated. In place of the lettered shields which have been used heretofore are provided electric tube light signs by which the names of the cars are spelled out with miniature lamps. This method of designation prevails on the first and second floors, while on the third and fourth floors the older sign is used.

There is one feature of the scheme of decorations which is worthy of comment, particularly in its contrast to some former exhibitions. That is the fact that the cars are the prominent feature and not the decorations. The decoration is beautiful and brilliant but it is contributory to the general arrangement and does not appear to be its primal object.

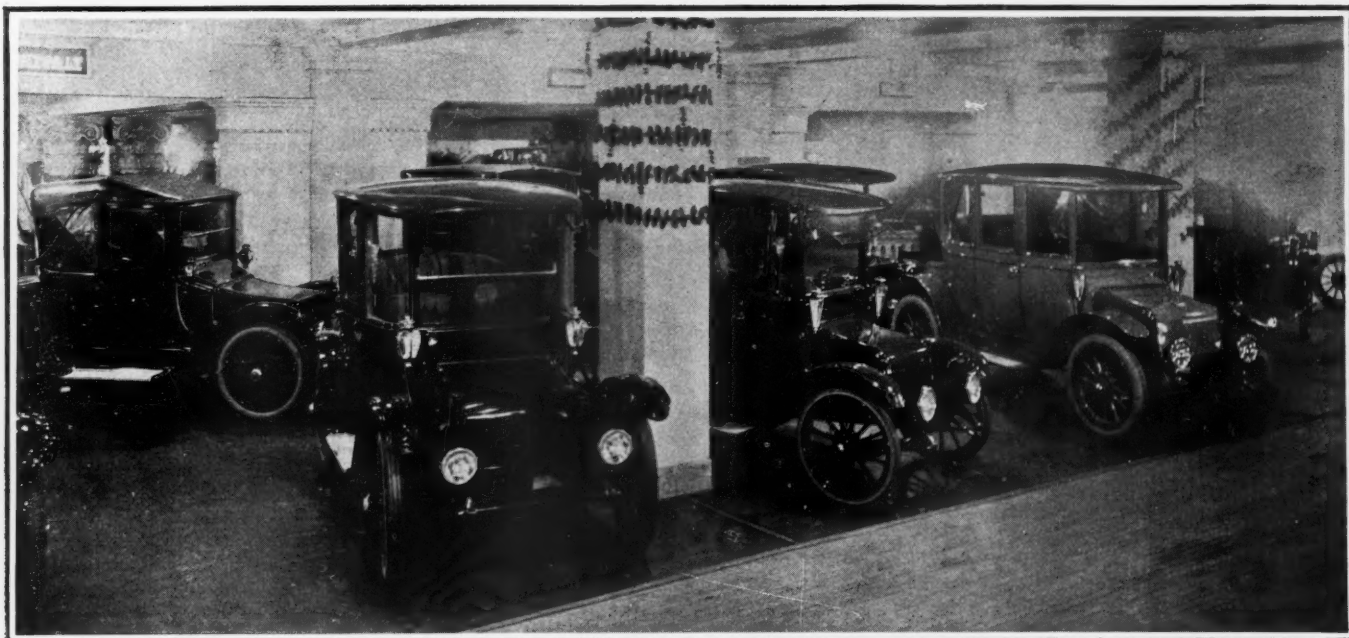
The effect of unlimited space is given by the use of some 50,000 square feet of mirrors which cover the walls. These are enormous pieces of crystal, some of them measuring 19 by 7 feet. These are mounted in gilt frames. Alternating between the mirrors about the main floor are decorative sunbursts which produce a decidedly beautiful effect. The central court is decked with garlands of roses and wisteria.

**Plaster-Casts Abandoned**

The plaster-cast pillars with their statuettes used last year are not in evidence this season, the only plaster cast being a few statues of Motoria, which represents the spirit of speed.

As one enters the Palace the lobby has not the Persian effect, but is made to resemble a California garden. The lobby forms a pergola with walls consisting largely of mirrors. The electric light fixtures are in the form of tulips. Bay trees stand about the columns, which are covered with lattice-work and creeping vines.

In the arrangement of exhibits, the scheme used in previous years has been



A GLIMPSE AT THE ELECTRIC CAR SECTION IN THE PALACE

carried out. The main floor and the second or mezzanine floor is devoted wholly to motor cars. The third floor houses the overflow of cars from the other two floors and also the overflow of accessory exhibits from the fourth floor, the latter being devoted wholly to accessories and motorcycles.

#### Show Easy to See

The scheme employed last year by which all the floors were made equally desirable as exhibit locations is followed again. In this, the elevators are express to the fourth floor from the first and do not stop at either of the intermediate floors. The elevators carry passengers only in ascending. Visitors therefore are compelled to walk down from the fourth floor and consequently must of necessity visit every floor. An equally important result of this arrange-

ment is that the visitors are pretty evenly divided over the various floors and there is no great congestion at any one point.

There is a total of 317 exhibitors at the Grand Central Palace this year. This number is somewhat less in total than appeared the two previous years during which the palace was the scene of the show, but there are more car exhibitors than there were last year. There are eighty different makes of cars on exhibit now as against seventy-eight in 1914, 223 accessory exhibitors, which is something fewer than last year and twelve motorcycle exhibitors. There are fifteen different electric cars on exhibition, being the product of five makers. There is a total of 528 cars to be seen at the Palace, ranging from \$295 to \$6,000 in price. The estimated cost of the exhibits as a whole is \$3,560,000 spread over

### New York Show Statistics

|                             | Grand<br>Cent.<br>Pal.<br>1915 | Grand<br>Cent.<br>Pal.<br>1914 | Grand<br>and<br>Pal.<br>1913 |
|-----------------------------|--------------------------------|--------------------------------|------------------------------|
| Total exhibitors .....      | 317                            | 349                            | 424                          |
| Car exhibitors .....        | 80                             | 78                             | 89                           |
| Accessory exhibitors .....  | 223                            | 78                             | 89                           |
| Motorcycle exhibitors ..... | ..                             | 12                             | 15                           |

#### GASOLINE CARS

|                                  |     |     |     |
|----------------------------------|-----|-----|-----|
| Two-cylinder .....               | 0   | 2   | 0   |
| Four-cylinder .....              | 96  | 132 | 189 |
| Four-cylinder (piston-valve) ..  | 0   | 1   | 0   |
| Four-cylinder (sleeve-valve) ..  | 10  | 8   | 6   |
| Six-cylinder .....               | 105 | 98  | 86  |
| Six-cylinder (sleeve-valve) ..   | 1   | 2   | 4   |
| Six-cylinder (crescent-valve) .. | 2   | 0   | 0   |
| Six-cylinder (rotary-valve) ..   | 0   | 1   | 1   |
| Eight-cylinder .....             | 7   | 0   | 0   |
| Total gasoline pleasure cars ..  | 221 | 264 | 266 |
| Touring cars .....               | 124 | 143 | 162 |
| Roadster .....                   | 48  | 50  | 49  |
| Limousine .....                  | 18  | 15  | 23  |
| Berline .....                    | 2   | 6   | 8   |
| Coupe .....                      | 7   | 17  | *19 |
| Phaeton .....                    | 1   | 2   | 1   |
| Landaulet .....                  | 1   | 1   | 0   |
| Raceabout .....                  | 3   | 2   | 2   |
| Sedan .....                      | †8  | 14  | 0   |
| Cabriolet .....                  | 4   | 5   | 0   |
| Brougham .....                   | 4   | 0   | 0   |
| Total .....                      | 221 | 264 | 266 |
| Air-cooled cars .....            | 3   | 6   | 5   |
| Water-cooled cars .....          | 217 | 258 | 261 |
| Total .....                      | 221 | 264 | 266 |

#### CHASSIS

|                                 |    |    |    |
|---------------------------------|----|----|----|
| Four-cylinder .....             | 20 | 21 | 27 |
| Four-cylinder (sleeve-valve) .. | 4  | 0  | 0  |
| Six-cylinder .....              | 26 | 15 | 21 |
| Eight-cylinder .....            | 1  | 0  | 0  |
| Electric .....                  | 0  | 1  | 1  |
| Total .....                     | 51 | 37 | 49 |

#### ELECTRIC CARS

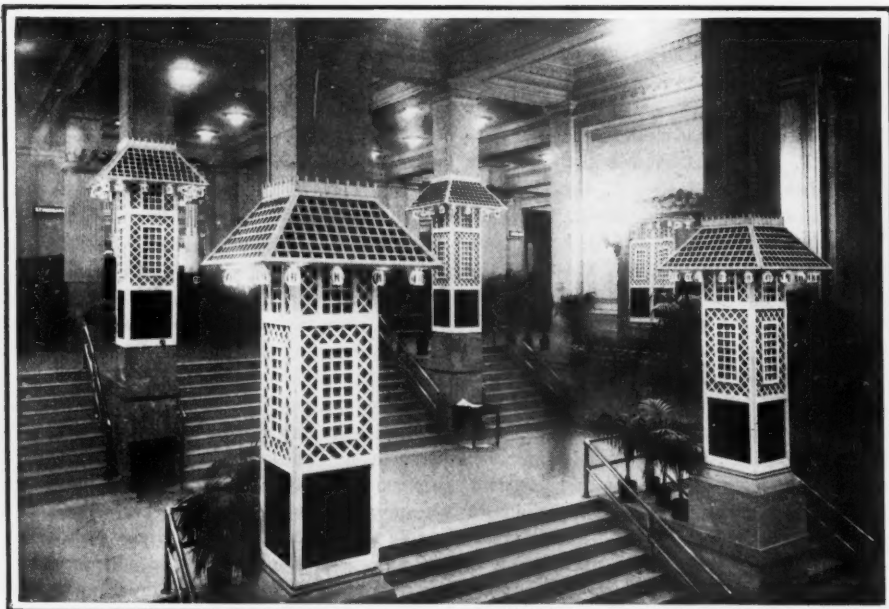
|                 |    |    |    |
|-----------------|----|----|----|
| Coupe .....     | 1  | 2  | 7  |
| Cabriolet ..... | 1  | 0  | 0  |
| Roadster .....  | 3  | 1  | 3  |
| Brougham .....  | 9  | 13 | 0  |
| Town car .....  | 0  | 1  | 0  |
| Limousine ..... | 1  | 0  | 0  |
| Total .....     | 15 | 17 | 10 |

#### SPECIAL EXHIBITS

|                                    |     |     |     |
|------------------------------------|-----|-----|-----|
| Racing cars .....                  | 0   | 0   | 1   |
| Grand total cars and chassis ..... | 286 | 318 | 325 |

\* Includes cabriolets.

† Includes two touring models with detachable tops.



ENTRANCE TO THE GRAND CENTRAL PALACE



a floor space of 150,000 square feet in the Palace.

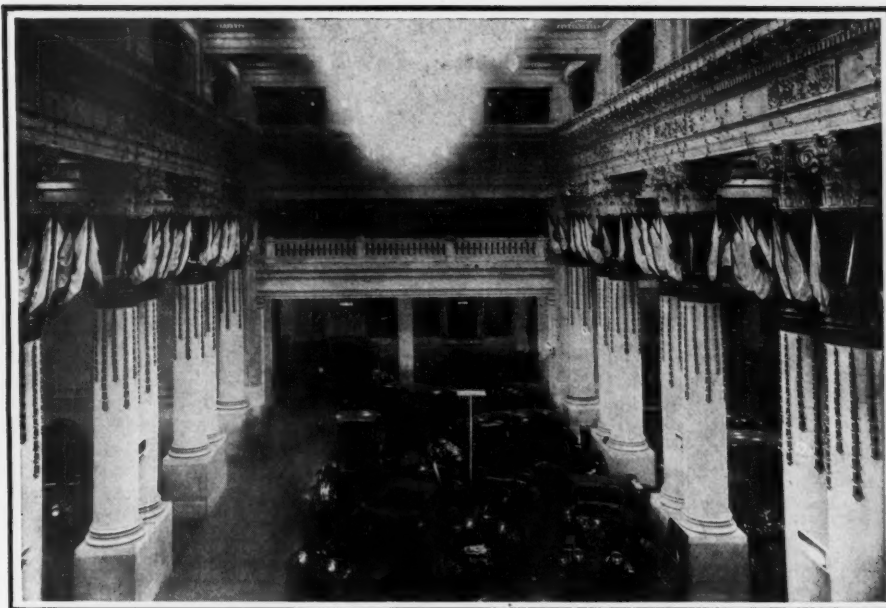
There is no commercial car shown this year, nor are any commercial cars exhibited at the Palace. Instead of this there is a special information bureau for commercial vehicle manufacturers and dealers in which each manufacturer has a representative at a desk who can exhibit photographs and blueprints and talk terms to prospective users and dealers. The exhibition is scheduled for 1 week, January 2 to 9, and is under the auspices of the National Automobile Chamber of Commerce, Inc. The show committee which is responsible for the general arrangement consists of Colonel George Pope, H. O. Smith, Wilfred C. Leland and S. A. Miles, manager.

#### New Eights Announced

Interest of the visitors naturally seems to center about the eight-cylinder cars, and two concerns have reserved the announcement of their eight-cylinder models to spring as a surprise at the show. These are the Remington and Detroit. There are ten eight-cylinder engines on exhibition, four in the Cadillac booth, a King, a Detroit, a Remington and two or three in the Massnick-Phipps exhibit of Perkins motors. Rumors are rampant of eight or ten other concerns which have definitely adopted the eight-cylinder and it is almost certain that there will be three or four more at the Chicago show.

Of the other unusual exhibits, the Owen car probably is attracting as much attention as any. This incorporates the Entz magnetic system by which clutch and gear-set are superseded by an electric transmission. Further interest is added by the use of the Weidely engine in an improved form. The latter has an overhead camshaft and was brought out originally for Premier.

Chalmers' new six also is an overhead camshaft engine and one which is surrounded by a coterie of interested visitors. In design it is quite similar to the Weidely engine but has its valves inclined in an angle of about 30 degrees.



COLUMN DECORATIONS OF PERSIAN GARDEN SCHEME

Another of the unusual engines is that of the Fischer Magic car which was on exhibition last year. This has a crescent-valve design but aside from its engine, is remarkable for the arrangement of the seven-passenger body in which the top folds down completely out of sight.

There are eleven Knight sleeve-valve engines which is just one more than were on exhibition last year. A great deal of interest still is created by these and there always is an interested crowd watching the operation of the cut out motors by which an educational campaign is carried on.

In the line of accessories there is a number of novelties, most of the interest centering about new types of electric lighting and cranking outfits. Gray & Davis has its new unit system there, Bosch has both the Rushmore and Bosch systems and is credited with having the most space of any exhibitor. Dyneto has just put in its latest Ford starting device. In fact, Ford starters seem to be in evidence in most every lighting and starting exhibit. Some

of the manufacturers of accessories have novel means of demonstrating the virtues of their devices, and one of the shock absorber people, Flentje, has the time-honored goldfish bowl riding safely over a mimic road of extraordinary roughness. A tire sealer exhibitor is busily driving nails into a tire. The Dann Oil Insert people have an adaptation of a moving picture machine in keeping visitors interested and incidentally conducting an educational campaign on the necessity of oiling springs.

Some of the car exhibits also have been arranged to point the moral of their being or to bring out some particular feature. In the Hudson booth, for instance, there a Hudson light six, seven-passenger touring car is mounted on scales to bring out the point of low weight.

#### Lecturers Are Numerous

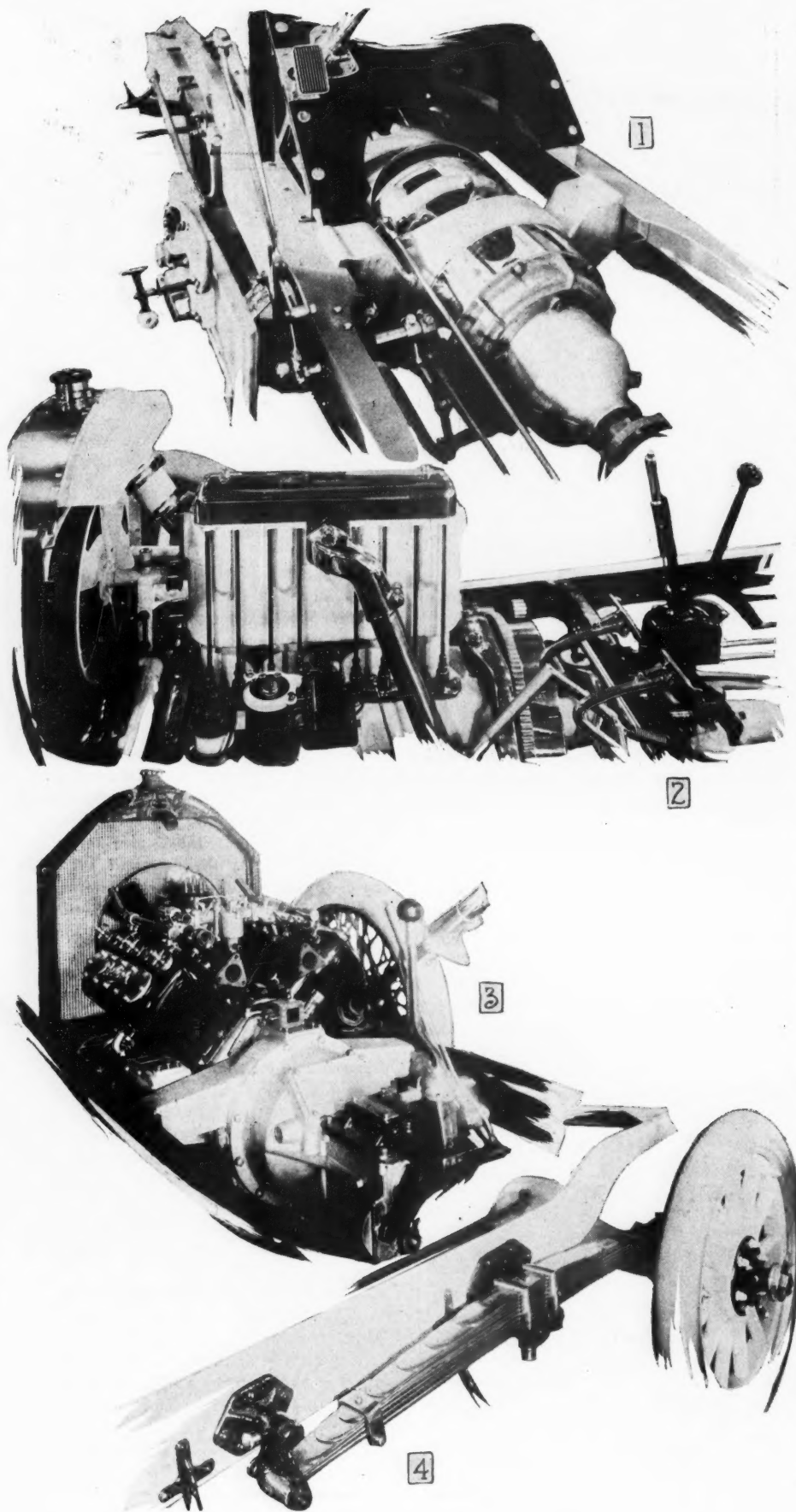
Lecturers in the various exhibits are more numerous than before but are neither so prominent in location nor so penetrating in voice. A recent ruling of the show committee provides that the lecturers shall be back from the front of the booth and shall not be so vocal as to interfere with the general auditory facilities in the building. Among the exhibitors who are using lecturers in pointing out the features of their product are the Stearns, Maxwell, Chalmers and Mitchell.

As usual, cut out chassis and motors are employed quite freely in the car exhibits. Most of these are arranged to be electrically-driven and visitors can see the actual working of the various parts where glass replaces cast iron and chilled steel. Among the exhibits having cut out and working parts are Maxwell, Overland, Studebaker, Westcott, Fischer, Stearns, Jeffery, Cartecar and a number of others. Some of them employ electricity to show the time of the spark by lighting up lamps instead of spark plugs. One concern uses these lamps to spell out the name or model of the car in colored letters.

Brilliant colors seem to be a little more



LOOKING DOWN ONE OF AISLES ON SECOND FLOOR



1—Electric transmission system on the newly-announced six-cylinder Owen car. This car is constructed so that the ordinary clutch and gearset are dispensed with; 2—Mounting of the four-cylinder overhead valve motor in the new \$1,000 Inter-State. Notice the odd location and construction of the exhaust pipe; 3—Perkins eight-cylinder motor as mounted in the new Remington, a surprise at the show. The Remington is a new concern in the field. 4—Long flat cantilever rear springs are used on the 1915 Pilot

in evidence than they were last year and the brightly colored cars which serve to give contrast are for the most part stock jobs and not, as most often has been the case heretofore, special designs from stem to stern. The National exhibit has a large number of different colors, with the Packard display a close second but the specially designed show cars are conspicuous by their absence, though delicate colors exquisite and luxurious creations are present.

The most conspicuous of the cars at the National booth is a coupe of canary yellow with the panels and lower doors and the wheels and running gears in red. The body is so unusually roomy that it is almost a sedan. Of course the salon touring car with its individual seats running on their little tracks are creative of a great deal of comment.

#### Luxurious Cars Shown

Packard's chief drawing card at the moment seems to be a roomy sedan model finished in a delicate green and set off by canary yellow window sashes and running gear. Pierce-Arrow has an olive green and black, Peerless has a roadster in dark green and Fiat a luxurious limousine of the same shade but set off by black striping and gray bedford cloth upholstery.

There are two Cunningham models which compel attention. One of these is an open-front limousine or brougham provided with a detachable roof which fits over the driver's compartment and makes the car into a true limousine. The upper portion of the body has one of the latest fashionable tints which has come to be known by the rather unphonious title of sand or putty color. The trimming is in mulberry. The combination of these two tints is carried out in the velour upholstery by using alternate vertical stripes of these shades. Exteriorally, another touch of distinctiveness is given by the canary yellow wheels.

Another of the Cunningham bodies is a rather extreme streamline effect in which the engine hood is blended so cleverly into a very deep cowl that it is almost impossible to determine where hood and body meet.

#### Cole's Cubist Roadster

Cole's exhibit is set off by the cubist roadster, a special job which is described in detail on other pages. Likewise the Lewis VI sedan is calculated to attract attention. It is finished in canary yellow with green hairline striping and is provided with a skylight in the roof which can be closed by a silken curtain. The windshield has an unusual feature, as it is double, the outer-portion hinging at its top to give a rain-vision effect and the lower portion sliding vertically.

A car which is not really new but shows a number of new features is the Premier, which has been considerably revamped and now has a modern streamline body with divided front seats and exceptionally clean lines. The case also has undergone considerable change, the most noticeable of



which is the cantilever springs, this being the first appearance in that form.

Naturally it was to be expected a great deal of attention would be attracted by the exhibit of the new Dodge car and such is the case. Aside from the roadster and touring models there was a stripped chassis in which the front end of the motor was cut away, showing the starter drive and the brass railings which surrounded the chassis was lined three deep most of the time.

Mercers were found to be a drawing card on account of the radically new design throughout and the mechanical features were brought out by means of a stripped and polished chassis. Jackson shows for the first time its new four model.

#### Scripps-Booth Late Arrival

The Scripps-Booth, which also makes its first appearance, was a little late in arriving at the show but when the natty little roadster and coupe appeared they were found to be worth waiting for.

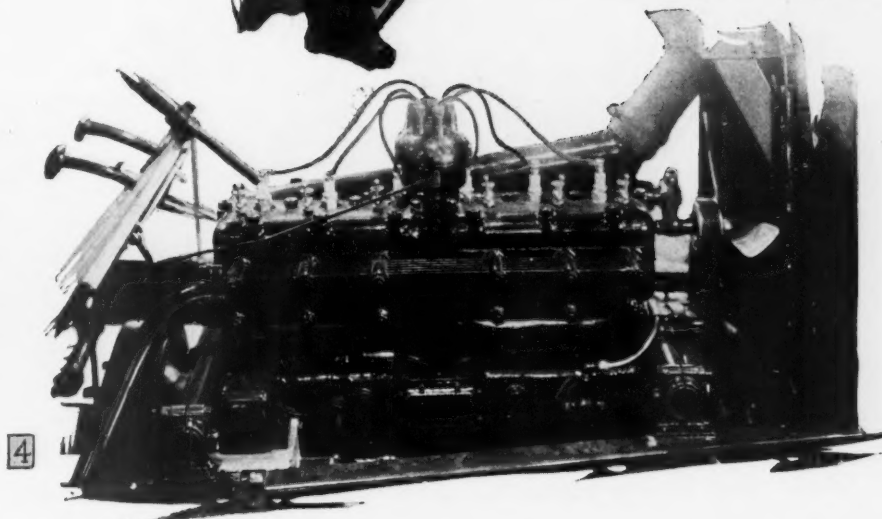
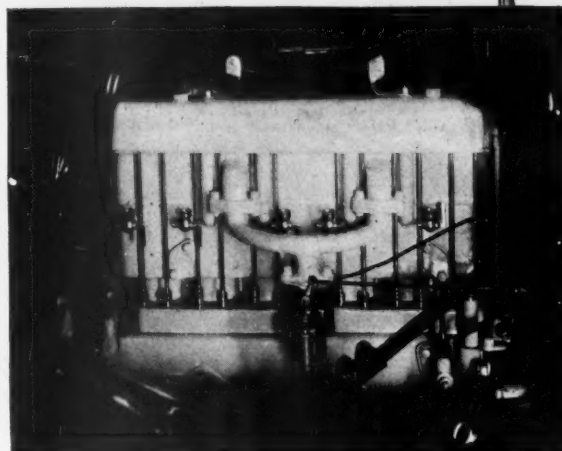
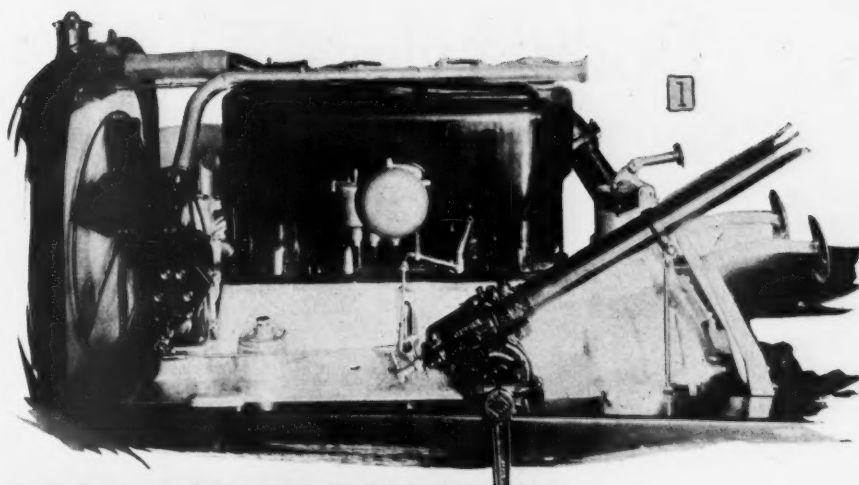
The new Argo also attracted attention chiefly on account of its low price and the ingenious way in which the car is designed for low production cost combined with a satisfactory operating efficiency.

The Briscoe exhibit is distinguished by a white roadster which has a unique type of top, having a back mounted just like a windshield, the roof proper buttoning from back to front windshields. This is one of the three-passenger roadsters with the third seat set back and in the center. This type of seating arrangement seems to be coming into popularity with the manufacturers as it is used in the Owen and a number of others, while the Chevrolet new touring car, which nominally accommodates four passengers, is designed to carry a fifth passenger when a section of the rear cushion is shifted back several inches to provide the necessary shoulder space for three instead of two. The Owen has a disappearing top on one of its models which folds completely into a compartment built into the body and which is not perceptible whether the top is up or down. The Lewis six roadster also has a disappearing top.

#### White's Body Styles Impressive

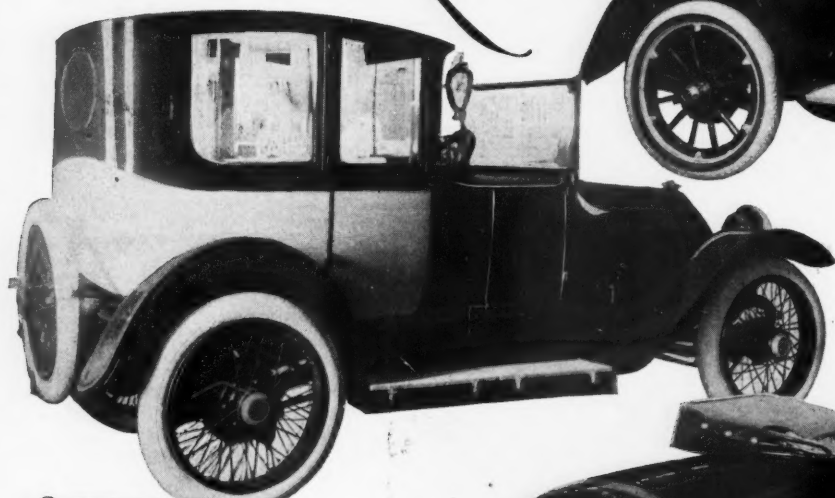
Advanced body design on the White cars is impressive as a contrast from the usual type on exhibition. Particularly does the double cowl effect and the luggage cabinet at the rear of the front seat attract comment. The Winton with a similar locker for luggage and its streamline body also is a feature. The new sixes, the Saxon, Grant and others of very low price are proving drawing cards at their respective booths, but for the moment the eights seem to have the call where the motor enthusiasts gather.

The Studebaker, Overland and Maxwell booths are set off by stripped and working chassis or cut away motors and are proving a popular educational feature. The new Paige six with its unusual type of rocker arms is attracting attention.



1—Six-cylinder motor of the Owen car, showing the transversally-set magneto and odd carburetor installation; 2—New six-cylinder Grant overhead-valve motor, showing the cover for completing inclosing the valve mechanism; 3—Rear spring suspension on the 1915 Case 25 is by cantilevers as shown, the 1914 car having been equipped with platform suspension; 4—Six-cylinder engine in the new Saxon six. Note the position of the timer-distributor and the ribbed exhaust manifold

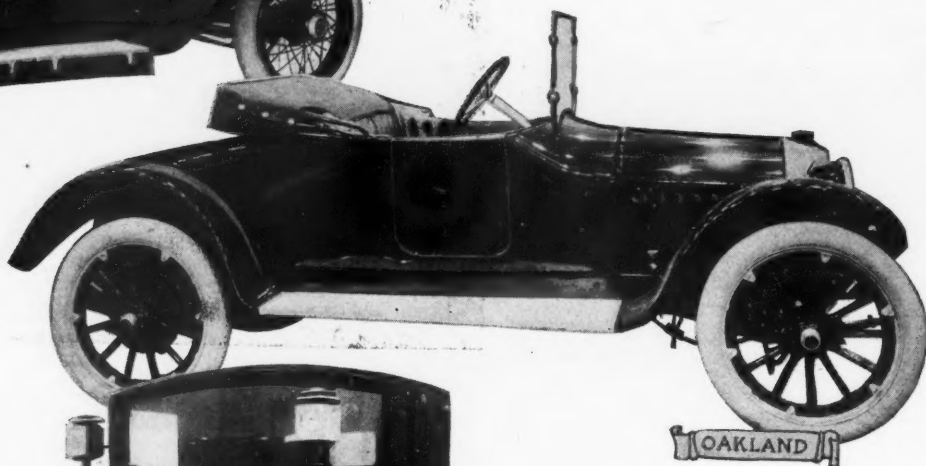
# New Body Styles *at the* New York Show



WILLYS-KNIGHT



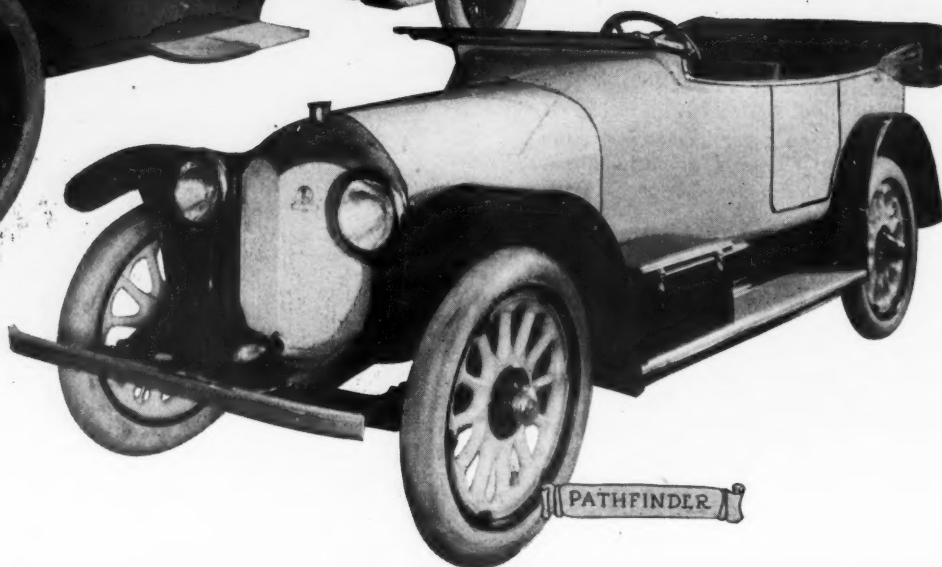
OAKLAND



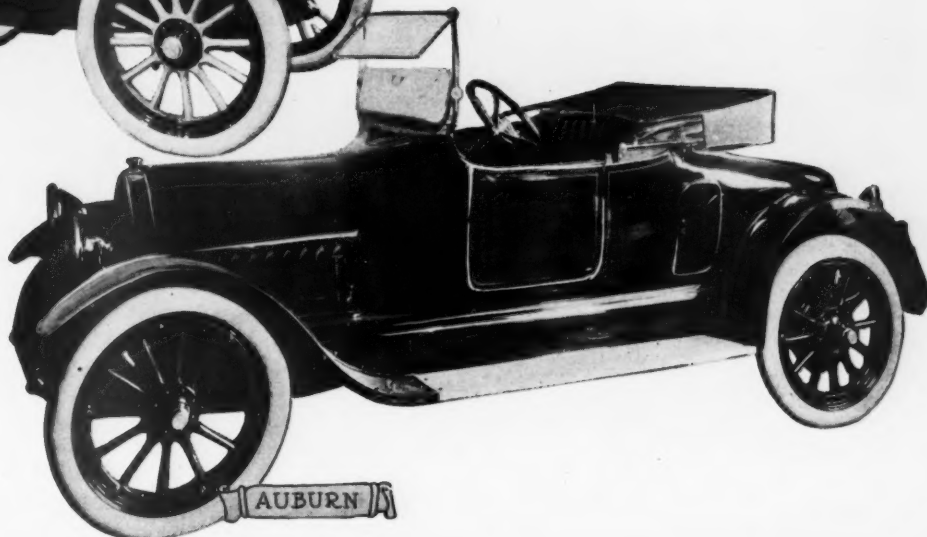
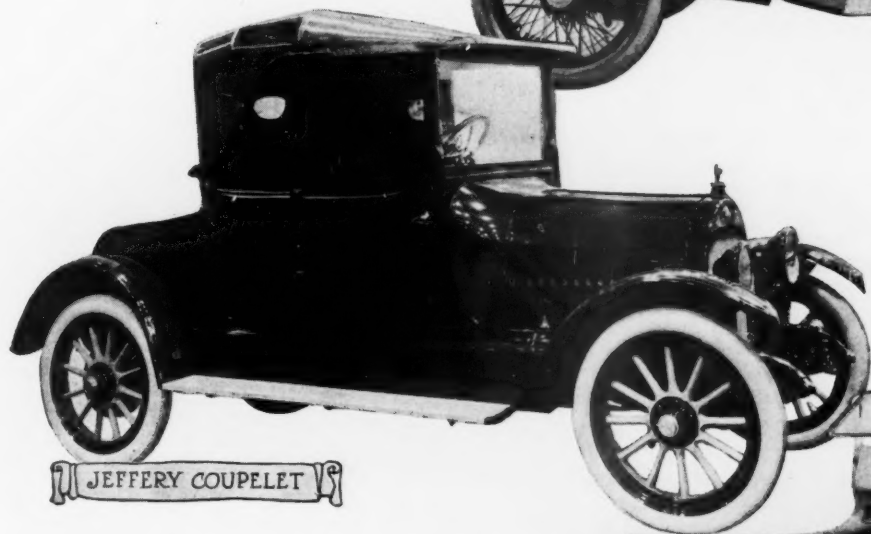
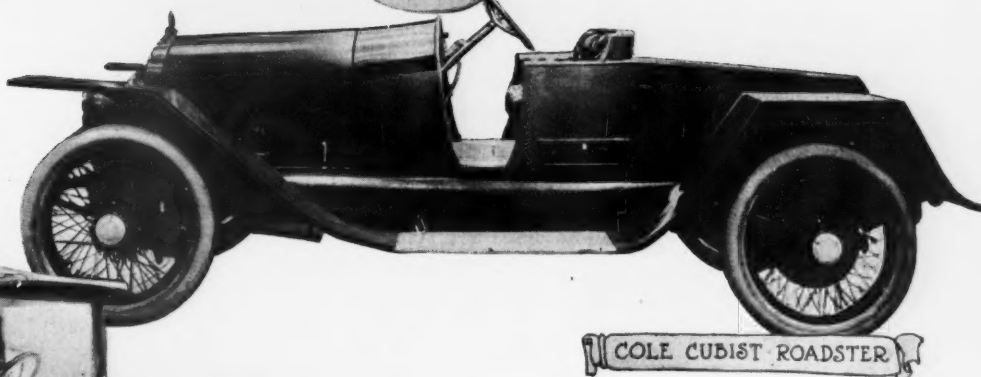
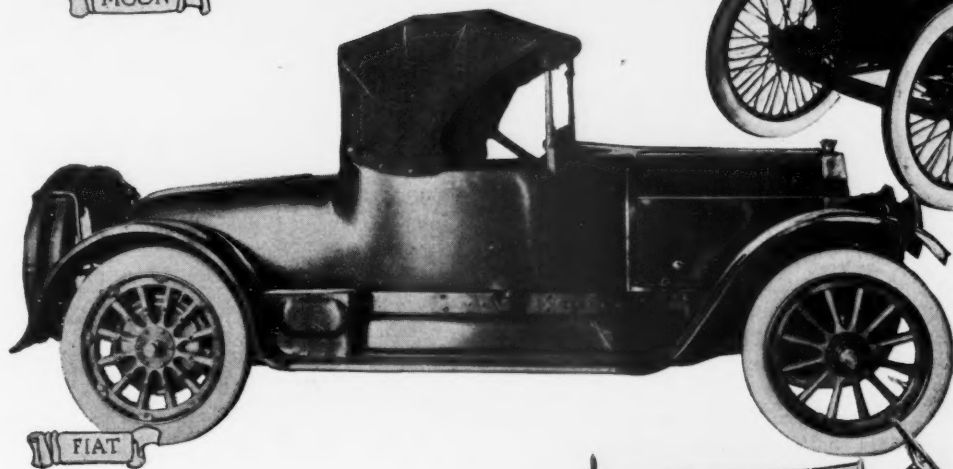
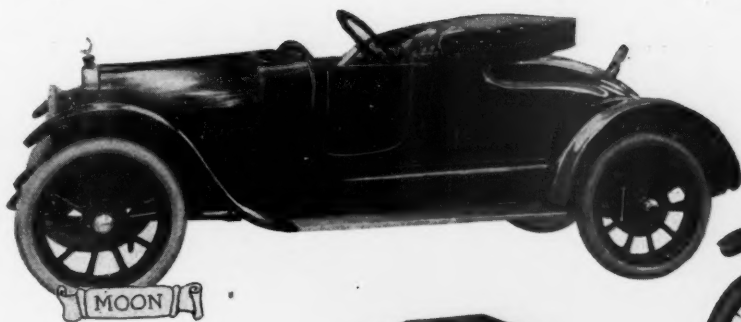
OAKLAND



LOCOMOBILE



PATHFINDER





# Latest European Art Shown by Importers in Salon

## Foreigners Display New Models of Motor Cars and Body Styles

NEW YORK, Jan. 2—As usual the importers are showing the productions of the European factories at the same time the American manufacturers are unveiling their new models and today the annual salon opened in the ballroom of the Astor, with forty cars on view, the display including two Yankee exhibits.

The works of eight foreign manufacturers and two Americans are on exhibition in addition to the products of several of the representative body makers of England, France, Belgium and the United States. The foreign manufacturers represented are deDion-Bouton, Peugeot, Isotta-Fraschini, Lancia, Renault Freres, Rolls-Royce, Sheffield-Simplex and Delaunay-Belleville. The body makers represented are Holbrook company, Locke, and Brewster. In addition to these there are several body manufacturers who have their products incorporated with the exhibits of the manufacturers. The Faure, Dunlap and Hardmann tires also are shown.

In spite of disturbed conditions abroad several new models are to be seen in the exhibits at the salon. De Dion is showing six cars. Two are mounted on 50-horsepower eight-cylinder chassis, one on a 20-horsepower eight-cylinder, one on a 16-horsepower four-cylinder and another on the same chassis as the latter, with a different body.

### Holbrook Bodies on de Dions

The two touring cars are products of the Holbrook body company and are streamline touring models with the double cowl, which has been the feature of foreign bodies of elegance during the past year. On the 20-horsepower eight there is a limousine by Healey & Co. On one of the 16-horsepower fours there is a landaulet by Healey and on the other an inside-drive by Holbrook.

With the exception of the body work the de Dion chassis has had no alteration during the past year. The bodies, however, show the effect of a year's development in moulded design. The touring bodies, following the practice now used by the leading body makers are of the dull oil finish. Town-car bodies, such as limousines, landaulets and inside-drive cars are keeping the polished surface. This is shown in the touring and town bodies of both Holbrook and Healey in the de Dion exhibit.

Fiat has made no important changes in mechanical design, but some of the motors and chassis dimensions are slightly larger to accommodate the longer chassis. The wheelbase has been slightly increased on both the 20-30 and the light 30 which they are exhibiting. Altogether Fiat is showing six cars. On the 20-30 there is a limousine and a coupe by Fleetwood and on the light 30 a touring, limousine, sedan

and a runabout which was turned out by Brewster.

The feature of Fiat exterior appearance is in the use of the moulded radiator, which gives an elliptical appearance to the front of the car. The body work on these cars also exhibits a tendency toward the oil finish for all around work and the polished finish for town use. The fitting of the one-man top on cars of higher price is brought out strongly by its use on the bodies exhibited at the salon.

### Four Peugeots on View

Peugeot is showing four cars. These are a stripped chassis, a Baby Peugeot, a racing car and a five-passenger touring body. The latter is an example of quiet luxury in this standard type of body. It is from the plant of G. Mossier, Neuilly-on-Seine, and while along conservative lines, is one of the striking bodies at the show.

The Isotta exhibit includes two touring cars, both of seven-passenger capacity, a seven-passenger collapsible landaulet, a special high-speed roadster and a stripped chassis. One of the touring cars, which is mounted on a 45-55 chassis, is a striking adaptation of the streamline design. It is painted black with satin finish. The seven-passenger body on the 12-horsepower chassis is an example of the divided front seats having an aisle between the two. A special feature on both these cars is the inclosing of every moving part, giving positive protection against dust and dirt.

The Isotta exhibit is of interest in that it is an example of the use of front wheel brakes. On one of the models there is also a brake fitted on the transmission shaft, giving three sets. The special 55 roadster shows a departure from the regular 55 car, which is furnished with a touring body, in that it is an example of lightweight construction throughout. It has the same dimensions as far as the power plant is concerned as the regular 55, but in addition it is fitted with hollow connecting rods, a hollow drive shaft and lighter frames, giving a greatly reduced weight and rendering possible high speeds. It is classified as a gentlemen's roadster and is a good example of a luxurious speed type. It has a seating capacity of three passengers. The wheelbase is much shorter than that of the regular 55, being 129 inches, as compared to 135 on the touring cars mounted on this chassis. The motor is 120 by 160 millimeters, or in inches, 4.2 by 4.6.

On the 25-35 there is a Van den Place collapsible body that is of the design which bears its name, but which has been made in this country.

A striking feature of the de Dion exhibit is a boat-line touring car painted white, as far as the body part is con-

cerned, but having a black hood and black running gear. No top or windshield is shown on this body and in place of the side lamps there are ventilating cowls, which give the appearance of a marine body. The sharp contrast of the white against the black sets the boat-shaped part of the car in sharp relief against the black background.

There are nine Lancia cars exhibited. Four of these have Holbrook bodies showing original developments of the limousine, landaulet, coupé and inside-drive types. Two are by Hayes and Miller, showing a special design of four-passenger car and a runabout, and three are by Fleetwood. These are an inside-drive sporting-type, a limousine, and a coupelet. In addition there is a stripped chassis. No mechanical changes are to be noted on the Lancia cars, the studies in luxurious bodies being the feature. The high spots in Lancia design are the compact block-cast motor and the use of the chain-tightened brake on the propeller shaft.

Sheffield-Simplex is a new arrival to the ranks of salon exhibitors this season. The 30-50 chassis, which is in company with another, having a genuine Brussels Vanden Plas body. This exhibit is interesting because it is in company with another; it has a Belgium body from the works of the famous manufacturer. The Sheffield-Simplex is fitted with the U. S. L. starting and lighting system and has a Lancaster worm drive. As an example of fine material it occupies a high place. The frame, for instance, is of pressed nickel steel and throughout Sheffield steel is used in the construction work. All the fittings are nickel-plated and the springs are floating cantilevers.

### Eight Renaults Displayed

Renault has eight cars at the exhibit. They are on five chassis. Four of these are fours and the other a six. All the bodies on the Renault cars are imported. They represent the works of Kellner and Rothschild, of Paris, and Vanden Plas, of Brussels. The Renault concern is another example of where a company has taken a standard model and cut it down to lightweight for use as a special high-speed sporting model. The special is three-passenger runabout on an 18-30 chassis. It has been lightened by the use of hollow parts, lighter frame sections, etc. The power plant dimensions and the principle drive units remain the same as on the heavier car producing a very light and speedy product.

Mechanically the Rolls-Royce cars remain the same as they have for the past five seasons. There is one chassis, a six, and at the exhibit this is shown dressed in four different body styles. In addition to this there is a stripped chassis which

has just arrived from the works of the British manufacturer. The bodies shown are both imported and domestic. Two are the works of Barker & Co., London. These are a limousine and a cabriolet. The other two are from Fleetwood's plant. These are a brougham and a four-passenger design.

#### Simplex Company Showing

Simplex, one of the two American manufacturers who are included in the salon exhibit, is showing four bodies on an improved line of two chassis. In addition to these there is a polished chassis. The mechanical changes which have taken place in the Simplex line are not in the nature of changes in specifications, but in such details of the timing, shorter intake manifold, higher carbureter, flush cowl board and the use of a drive-shaft service brake on the shaft drive models. This is mounted just back of the gearset, behind the ball and socket universal joint.

The bodies on the Simplex are produced by Quinby and Holbrook. Three of the bodies are mounted on the larger chassis known as the 50, on which either shaft or inclosed chain drive is offered as an option. These are a four-passenger inside drive by Quinby, a limousine by Quinby, and a seven-passenger touring car by Holbrook. On the 38 there is a coupé-landaulet by Holbrook.

On the Holbrook stand there are two cars. One of these is a Fiat with a town body. The other is a de Dion eight-cylinder, having a body of streamline adapta-

tion in grey-green, with an oil-finish. This car is fitted with a one-man top and shows the tendency of making the high-priced body of dull finish in order to give durability under the stress of touring conditions.

Brewster is showing three bodies. These are an inclosed drive with a collapsible top and a Rolls-Royce chassis; a brougham on another Rolls-Royce chassis, and a brougham on a Delaunay-Belleville six. The combination inside-drive with a collapsible top is a unique construction, giving the advantages of a landaulet and a collapsible. The inside-drive feature is in line with a general trend towards favoring this style of body which is exhibited at the salon. The straight limousine type seems to be losing ground as far as would be gathered by a general impression at the salon.

#### U. S. AFTER ARMORED CARS

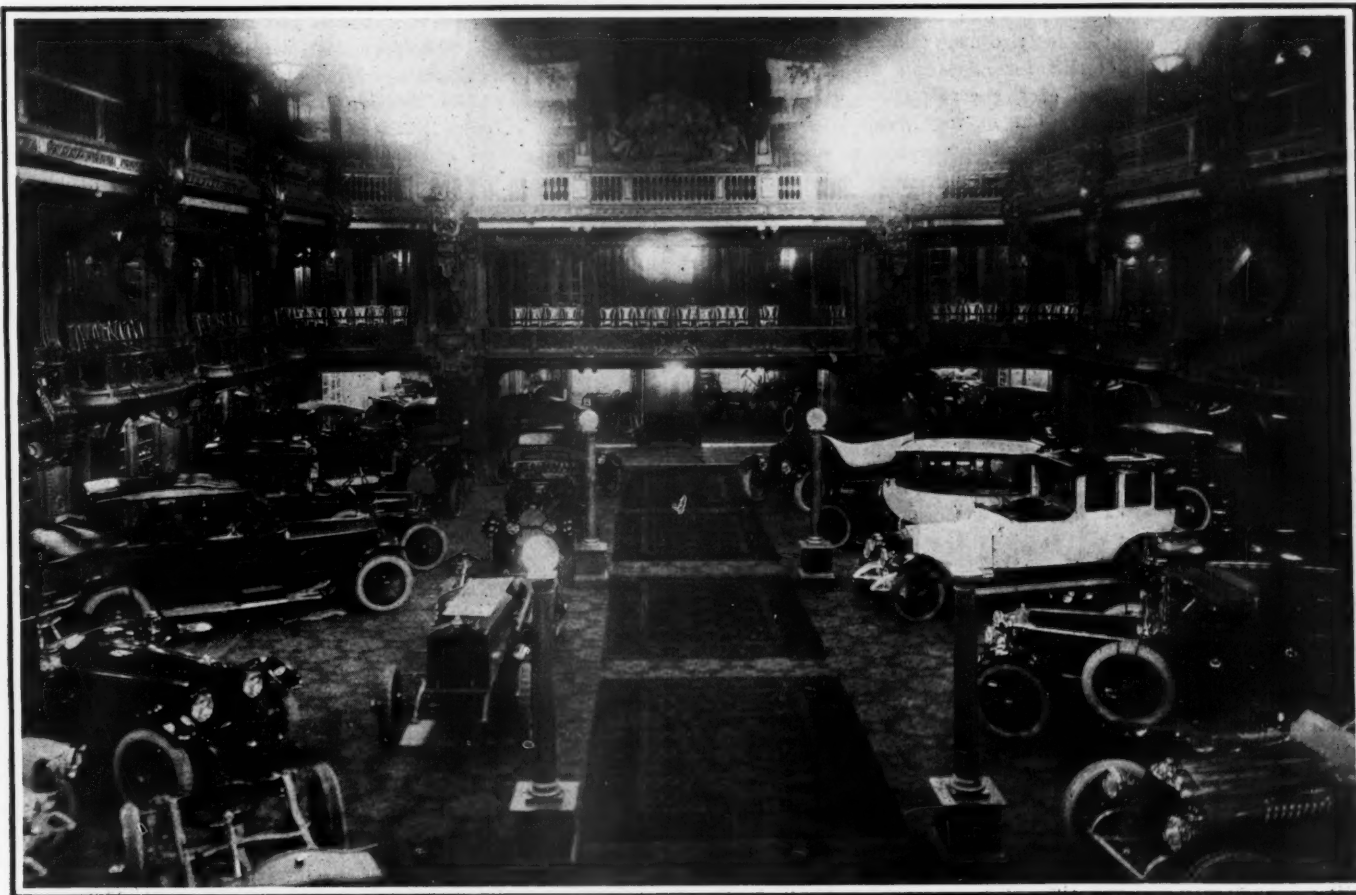
Washington, D. C., Jan. 2.—The army appropriation bill, when reported to the house of representatives, will be found to contain a new item of \$50,000 for the purchase and manufacture of armored motor cars. This appropriation will be expended under the direction of General W. L. Crozier, chief of ordnance.

At the recent hearing before the committee there was some consultation with General Crozier when he appeared before the house committee on appropriations. It

appears that there is at present under construction a vehicle which is intended for experimental use. General Crozier believes that there will be no difficulty in obtaining these motor cars in sufficient number when necessary, inasmuch as the armament and the armor will be easily and quickly obtainable, and it is believed there will be no delay in buying the chassis.

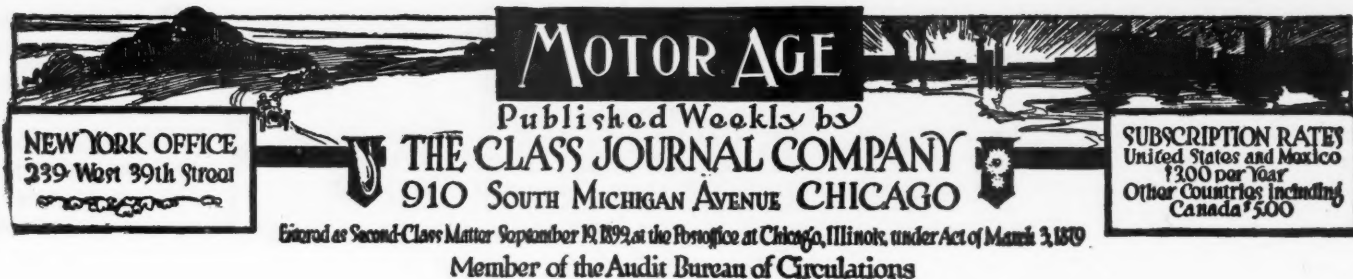
It is necessary, however, to design the armor and to determine its location, the main point being to protect the vulnerable parts of the engine. The quest of the army experts at present is in the direction of a satisfactory model. General Crozier believing that several of the types now in commercial use may be easily converted to armored cars of the necessary powers of resistance to attack. The armored car is intended to carry two machine guns and eight men, including the driver. It is proposed to have three places in the car where the machine guns may be operated and so arranged that the ordnance may be shifted to meet the necessities of a particular occasion.

The results obtained with the armored car in Europe have impressed the officers as suggesting a new form of mounting ordnance, but a vehicle of this sort may not be as available in this country as it is in a continental European war, because of the lack of roads in the United States, which would render the armored car serviceable to the extent it has been evidently used abroad during the present war.



GENERAL VIEW OF IMPORTERS' SHOW IN THE BALL ROOM OF THE ASTOR, NEW YORK CITY





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## As Told by Father Knickerbocker

NEW YORK'S fifteenth annual motor car show once more demonstrates that there is still ample development in the motor car field to warrant the continuation of annual shows for several years; yet unfortunately each year finds some phases of interest lacking, which it would seem the show management should actively take up before another year comes round, in order that show visitors will really have a chance of seeing a complete exposition of the motor car industry. The show of cars is the best ever seen at an individual show in New York, there being few concerns making cars that are not showing, some because they have not exhibited for several years, and others, which have been regular attendants but which are not present this year for unknown reasons, one or two cancelling space the last week.

AS last year there are several lines of accessories not well represented, notably the tire concerns, which in the majority of cases drew out a year ago. Every visitor at the show, who owns a car, is vitally interested in tires. Tires wear out, new ones must be bought every year, and as the tire cost is one of the heaviest in car operation with many people, it is regrettable that the tire makers are not present, if for no other reason than that the doctrine of better tire inflation, and of giving tires better attention might be preached to the tens of thousands who attend the show. This year the much more general use of cord tires would constitute a very interesting chapter in tiredom, and the show would offer a good campaign ground for educating the public in the advantages of this new form of tire construction, a construction relatively new in this country but in very general use in some foreign lands.

THERE are fewer accessory concerns exhibiting who manufacture materials for motor cars, such as different grades of steel, bronze, etc., and also fewer exhibiting who manufacture component parts of motor cars, such as axles, frames, springs, motor castings, forgings for cars, and also stampings used in cars. It is only to be expected that such firms would gradually withdraw from the shows, as their sales are directly to car and parts manufacturers, and the public could not have a stamping changed to a forging or vice versa in a car if it so desired. The same is largely true of bearings, which are not made optional with any car sale. Frames can justly be included in this category, and also wheel rims, of various types, although there is a fairly good representation of such at the show.

THE eight is naturally a great talking point with many, there being four different companies exhibiting eights. The public has not generally passed verdict on the eight, but is properly waiting until more are on the roads and it is possible to get a true line on their characteristics and performances as judged by highway achievements.

THE small car is in greater prominence at the present show than ever seen at any previous New York exposition. Years ago Chicago was always looked upon as the hub of small cars, and motor buggies, as they were designated in those days. Today matters have altered and now New York has its big quota of small machines. There are eleven different makes of what can truly be

termed small cars, this representing nearly 12 per cent of the total number of exhibitors. Of these eleven practically eight are companies that have been in existence for some time, so that their presence lends an air of permanency to the small-car field that was lacking a year ago. It is true that this field is still beset with a few stock-selling propositions, but these are rapidly becoming weeded out, and the end of the present year will see a definite clique of manufacturers of this type of car, which has now crystallized into more definite form.

THE exposition of electrics is not so large as would be liked, but New York is a poor electric city and we will have to wait for the Chicago show to see a great exhibit of electrics, Chicago being the greatest user of electrics of any city in the world. There are only five makers present at the New York show, but their exhibit is a most creditable one, showing all of the leading types. The exhibit of chassis, a characteristic of a year or so ago, has practically ceased.

PERHAPS the exhibits of electric starting, lighting and ignition systems are the greatest in the accessory part of the show. There has been amazing progress made in the last year in the development of the various electrical machines used for this work. One big company estimates that it has made 75 per cent of its progress during the past year. A year ago the manufacture of electric starting apparatus was largely a matter of a concern having one or two models of starters, that would be used on various makes of cars. Today it is largely changed and now not a few of the large makers build nearly a dozen different styles to meet the requirements of the car makers. Others announce that they will practically build any type to meet the needs of the car builder. With this change having come over the starter field, it is not surprising that these exhibits are among the largest in the accessory department, some of them including half a dozen or more complete motors with different forms of starting and generating mechanisms attached.

HAND in hand with the development of the starter and generating business has come the enlarged use of the timer-distributor attachment for ignition with these outfits, this arrangement displacing the magneto, so that but two units are employed, the engine starter and the electric generator with which is combined the ignition outfit, consisting of some form of step-up coil, a primary breaker mechanism and a high-tension distributor mechanism. Exceptionally compact designing work has been done in this field. There has been a very perceptible increase in the number of electric systems made specially for one make of car exhibited. Nearly half a dozen of such have sprung up during the past fall and every week brings the announcement of some new one.

A CURSORY analysis of the accessory exhibits shows that not a few new styles of carbureters have been developed during the year; some new mountings for speedometers are seen; watches for various types of passenger cars and trucks are more in evidence; the exhibit of batteries is smaller than a year ago; but the exhibits of lubricants is quite up-to-date. Apparently there is nothing that might not have been anticipated.



# Uncle Sam Compiles Data for the Motor Car Industry

## Offers Report on Foreign Tariffs to American Makers

WASHINGTON, D. C., Jan. 2.—The extraordinary development of the American motor car industry is reflected in the rapid growth of the exports of motor cars from the United States, which amounted to nearly \$28,000,000 during the fiscal year 1914, exclusive of parts and accessories. While the above sum is not very impressive as compared with the value of the cars produced in the United States during the last year, it is nearly forty-five times as large as the value of the cars imported into the country in the same year, and thirteen times as large as the exports of cars a decade ago by American makers.

### Standardization Tells

The success of the American motor car industry, particularly as regards low and medium-priced cars, is generally attributed to the American methods of standardization, which make possible the extensive use of machinery, but which also require production on a large scale. Under such conditions an outlet to foreign markets becomes a necessary adjunct to economical production for the domestic demand, and the American manufacturers of cars therefore have manifested a keen interest in the conditions affecting the marketing of their products in many of the foreign countries.

One of the first things generally considered in this connection is the import duties imposed on cars in foreign countries, and it is with a view to supplying this information to the American motor industry that the bureau of foreign and domestic commerce, of the department of commerce, has just issued a report showing the rates of import duty on motor vehicles of all kinds and accessories in practically all foreign countries. The rates are given in both foreign currencies and weights and their American equivalents, inclusive of surtaxes and similar items which serve to increase the cost of importation. There is, in addition, a summary table in which the rates are arranged so as to facilitate comparison between various countries.

### Uncle Sam's Best Customers

In considering the foreign tariffs on motor cars in connection with the distribution of the American cars exported during the fiscal year 1914, it would seem that the rate of duty is not always the determining factor. Our best two customers are the United Kingdom, which admits them free of duty, and Canada, where they are dutiable at 35 per cent ad valorem, each taking about one-fifth of our total exports. Australia, in spite of its import duty of about \$120 on the body, 5 per cent on the chassis, and 25 per cent on the tires, bought American cars to the value of more than \$2,600,000, while Argentina, with its comparatively low rate of 12 per cent ad

valorem, took only about \$1,000,000 worth, or about four times as much as was taken by Brazil, where the duty is about 16 per cent ad valorem.

An interesting feature in connection with the importation of cars into Australia and New Zealand is the requirement for a detailed list of the prices of the various component parts and accessories as sold for home consumption, such prices being used as a basis for ad valorem duties. This requirement differs from the provision of the Canadian dumping clause, where the statement in regard to the value for home consumption is required for the purpose of preventing or penalizing unfair competition with Canadian producers.

Copies of the report, which is entitled "Foreign Import Duties on Motor Vehicles and Accessories" (Tariff Series No. 30), may be obtained from the superintendent of public documents, government printing

office, for 10 cents each, stamps not accepted. It is believed it will pay the motor car manufacturers to send for this tariff rate book.

### IOWA HAS 106,000 CARS

Des Moines, Ia., Jan. 2.—The revenue of the state of Iowa from motor cars during the year 1914 was \$1,025,000 and the total number of cars registered was 106,000. This was the announcement of the state motor vehicle department at the end of 1914. Over 17,000 of the new plates had been issued before the end of the last year. It is expected that the registration in Iowa will pass the 130,000 mark this year. The new plates are bright yellow with black letters. An ample supply is on hand and the state will be supplied with all possible rapidity. Receipts in the state department are now running over \$10,000 a day.

See America First —  
• • • See America Now



EDITOR'S NOTE—This is the eighth of a series of illustrations and thumb-nail sketches of the scenic and historic wonders of America to be run in Motor Age with the idea of calling the attention of motorists to the picturesque points of interest in their own country.

### NO. 8—TABLET MARKING END OF PAUL REVERE'S FAMOUS RIDE

A popular ride with motorists living in the vicinity of Boston and tourists visiting New England is to follow the route taken by Paul Revere on his famous ride of April 14, 1775, when he warned the American patriots of the march of the British and "spread the alarm to every Middlesex village and farm." The tires leave marks in the road where the hoofs of Revere's sweat-lathered horse pounded, and the drive takes the motorist through a district rich in tradition and historic interest. At the point where Revere's ride ended, a granite marker and bronze tablet has been placed, telling of that early and spectacular episode in the story of America's struggle for independence.

# Universal Rim and Standard Welding in Patent Suit

## Other Matters of Interest to the Industry

CLEVELAND, O., Dec. 30—Suit has been filed in the United States district court here by the Universal Rim Co., Chicago, against the Standard Welding Co., Cleveland, O., the former claiming specific infringement of three of its patents, Nos. 1,095,770, 1,095,775, 1,095,953. These three patents relate to demountable rims and are claimed by the Universal company to be infringed by rims Nos. 20 and 21, made by the Standard Welding Co.

The patent No. 1,095,770 was issued to Joseph A. Anglada, May 5, 1914, and by mesne-assignment transferred to the Universal Rim Co., which claims infringement particularly of claims 3 and 4, which read:

A transversely split integrally flanged tire-carrying demountable rim having a hole in one end, in combination with a rigid latch fixed on the other end of the rim, extending beneath the end containing said hole and having a lug to snap into said hole, to connect said ends.

An integrally flanged tire-carrying demountable rim transversely split upon a plane inclined to a radius of the rim and having a hole in one end, in combination with a rigid latch member on the other end of the rim, extending beneath the end containing said hole and having a lug 14 to snap into said hole, to separately connect said ends of the rim.

Patent No. 1,095,775 was issued to Erle K. Baker and assigned to the Universal Rim Co., the patent date being May 5, 1914. In this patent, the Universal company claims infringement particularly of claims 1 and 9, which read:

A one-piece integrally flanged demountable rim of the bolted-on class described and transversely split at one point only in its circumference, in combination with a plate extending across said split and positively and non-adjustably but detachably connecting the ends of the rim, for the purposes specified.

A one-piece integrally flanged demountable rim of the bolted-on class described transversely split at one point only in its circumference and presenting straight cut non-interlocking rim ends, and means on said ends positively but detachably connecting the same render the rim inexpandible by the bolting-on devices for the purposes specified.

Both of the patents above mentioned were filed in 1910, together with something like forty others, and in the following year, in February, the third patent upon which this suit is brought, was filed. This, No. 1,095,953, also issued to Baker, and patented on May 5, 1914, relates to a rim of such construction that the rim shall be automatically centered upon the wheel when placed upon it. It relates to improvements in rims, in which the demountability is secured by wedges between the wheel and rim.

### HOLDS J. M. NO INFRINGEMENT

Chicago, Jan. 5—The court of appeals sitting in Chicago, has reversed the decision of the lower court in the suit of the Blackledge Mfg. Co., Chicago, against the J. M. Shock Absorber Co., stating that the J. M. shock absorber does not infringe the Velvet shock absorber made by the former concern. Judge Sanburn in the United States district court gave his decision on May 8, 1914, stating that the J. M. shock absorber infringed the Velvet, which is

manufactured under patent No. 988,229, issued to Charles A. Tilt, March 28, 1911. This patent relates to a shock absorber of the coil-spring type, which prevents excessive shock being transmitted to the car and passengers and also eliminates side sway.

The Blackledge company claimed in its suit in the lower court that the J. M. shock absorber is made under patent No. 1,015,682, issued to L. P. Jaquet, on January 23, 1912. Both this and the Tilt patent are quite similar, the latter consisting essentially of two coil springs operating in cylindrical cylinders and having a guide in the form of a rod inside each spring, with metal sleeves which may slide up and down over the rods within the range of spring vibration.

The decision of the court of appeals brings to an end this suit which originally was filed on April 13, 1913, against Albert J. Dueth and Alexander J. Dueth, doing business as the Alfredal Co. in Chicago and handling J. M. shock absorbers.

### TIRE CORE PATENT HELD INVALID

Boston, Mass., Jan. 4—The tire core patent No. 865,064, covering a collapsible core or mandrel, the object of which is to be used in the building up of a tire, after which it may be easily removed, has been declared invalid.

The patent which was granted September 3, 1907, to W. C. State, was taken over by the Goodyear Tire and Rubber Co., Akron, O., which brought suit against the Hood Rubber Co., Watertown, Mass., claiming infringement.

The Goodyear company claimed in its suit that the State patent covered all types of cores, used in the manufacture of detachable tires, having substantially non-extensible edges and comprising a plurality of independent sections held in ring formation by one or more rings overlapping the inner portions of the sections.

The decision, which was rendered by Judge Dodge in the United States district court for the district of Massachusetts, stated that prior to the invention of this core by State, substantially the same construction had been in commercial use at several other tire-making plants, in the manufacturing of detachable tires, having substantially non-extensible edges.

This core is made of four independent segments with inwardly projecting portions constituting an annular beading, with a pair of rings adapted for clamping these members in a proper relation to each other. In constructing the outer tubes or wear-resisting casings of pneumatic tires, this core or mandrel, which is annular, is employed on which the tire is built up of rubber and fabric. During this operation the edges

on the side bands of the tire, engaged by retaining means of a wheel rim, are so formed as to render them as inextensible as possible. After the tire has been built up and has been vulcanized, the segments of the core may be easily removed.

The suit just decided was filed December 5, 1910. Another suit on the same patent brought by the Goodyear Tire and Rubber Co. against the Ajax-Grieb Co. is now pending in the United States district court for the district of New Jersey.

On October 27, 1914, the Laski and Thropp Circular Woven Tire Co., Trenton, N. J., was awarded the decision in the United States district court there in its suit against the W. R. Thropp & Sons Co., Trenton, on a tire-wrapping machine put out by this company, under patent No. 1,011,450, dated December 12, 1911.

### REPORTS ON THE CRESCENT

Cincinnati, O., Jan. 4—In his first and final report as receiver for the bankrupt Crescent Motor Co., of Carthage, O., Louis J. Huwe, deputy United States marshal, declared that the affairs of the company had been remarkably well administered. From September 28, the time of his appointment as receiver, up to the time of his appointment as trustee in bankruptcy of the concern, Huwe made sales and collections amounting to \$17,944.51. He spent \$8,650.56, leaving a balance of \$9,337.51. Huwe reported that he turned over to himself as trustee this balance, together with other assets of the company, valued at \$101,171.55. In his report, which was filed in the United States district court at Cincinnati, Huwe asks that the sum of \$2,663.24 be given him as compensation for his services as receiver, and that his counsel be given an allowance. He asks the court to confirm his report.

### REFEREE PROMISES DIVIDENDS

Philadelphia, Pa., Jan. 2—Referee in Bankruptcy Samuel E. Bertolet informs creditors of the Marathon Motor Sales Co., bankrupt, that he has filed a first distribution and dividend sheet and has declared a first dividend of 4 per cent to unsecured creditors who have proved claims totaling \$12,603.66. Bertolet has directed the trustee to pay this dividend January 12. A second dividend of approximately the same amount will be declared after the expiration of 3 months.

### RECEIVER FOR FORGING COMPANY

Indianapolis, Ind., Jan. 4—Friendly receivership proceedings have been brought against the H. J. Martin Forging Co., and H. J. Martin, president of the concern, has been named as receiver. It is expected that a reorganization of the company will



take place. The assets are said to largely exceed the liabilities but a lack of ready working capital has caused the company some inconvenience.

The Central Trust Co., trustee for a mortgage securing a bond issue of \$80,000, brought the suit for receiver. It is alleged the company has defaulted in the payment of interest on the bonds and in payment of \$10,000 of the principal due Sept. 1, 1914.

Suit for a receiver for the Howe Engine Co., manufacturer of fire apparatus, has been brought in the superior court at Indianapolis by the Central Rubber and Supply Co. of this city. It is alleged the defendant, one of the pioneer manufacturers of motor fire apparatus, is insolvent. The suit asks that a mortgage be foreclosed, a receiver appointed and for judgment on an account of \$282.12.

#### MERGER OF BRETZ INTERESTS

New York, Jan. 4—The Bearings Co. of America, just announced, is the logical successor to the J. S. Bretz Co., the Fichtel & Sachs Co., and the Star Ball Retainer Co.,

both of Lancaster, Pa. All three of the old companies were dissolved during 1914, the idea being to concentrate the entire manufacturing, warehousing, the shipping and service departments at Lancaster, Pa., and the entire sales department at 250 West Fifty-fourth street, New York.

No change has been made in the personnel of the general management of the business, the idea being to continue it under the same efficient direction as heretofore, in the sale, production and importation of F. & S. annular ball bearings, ball thrust bearings, Star ball retainers, German steel balls and Bowden wire mechanism.

#### WILL NOT QUASH INDICTMENTS

Detroit, Mich., Jan. 2—Judge Tuttle, of the United States district court, today announced that he will not quash the indictment brought against the promoters of the Savage Motor Car Co. by the local grand jury last year, pending the outcome of the appeal made by the United States government against the decision of the United States district court of Cincinnati, O., which recently set the promoters—Delbert

H. Cummings, E. E. Taylor and Robert W. Fishback—*et al.* upon a habeas corpus writ, the Ohio judge holding that the government had not presented proofs in its case.

#### ACTIVITY IN INDIANAPOLIS

Indianapolis, Ind., Jan. 4—There is a very pronounced renewal of activity in the motor car industry of the state with the beginning of the new year. Conditions are not yet normal, but they promise to be so before long.

At Kokomo today the plants of the Haynes Automobile Co. and Apperson Brothers' Automobile Co. put their full forces at work. Similar reports are being received from other parts of the state.

In Indianapolis the Lyons-Atlas Co. is preparing to double its working force. Other plants are taking on additional employees gradually.

#### LOZIER SALE FEBRUARY 4

Detroit, Mich., Jan. 5—Referee in bankruptcy Lee E. Joslyn has ordered the sale of the plant of the Lozier Motor Co., to be held Thursday morning February 4, in the room of the United States district court.

At the meeting of the creditors of the bankrupt Lozier Motor Co., held last week, it was suggested by Vice-President Joseph A. Bower, of the Detroit Trust Co., trustee, that, as there is on hand in the plant \$200,000 worth of material, \$300,000 worth of additional new material be purchased so it will be possible to build 300 Lozier sixes and 300 Lozier fours, the latter to be sold at \$1,000 and the former at \$2,000. This would result in obtaining \$900,000.

This suggestion was not adopted by the creditors who, however, voted favorably upon the proposition of Attorney Leo M. Butzel that when bona fide offers for cars are received they should be built.

#### DORT COMPANY INCORPORATED

Flint, Mich., Dec. 31—The Dort Motor Car Co., which has just been organized to make the Dort cars, has been incorporated with a capital stock of \$500,000—of which \$400,000 is common and \$100,000 preferred—and out of which \$27,000 is paid.

The officers of the company are: J. D. Dort, president; D. M. Averill, vice-president and general manager; F. A. Aldrich, secretary-treasurer, and J. D. Mansfield, sales manager. These officers and George L. Simmons constitute the board of directors. Etienne Planche is the chief engineer and designer.

The personnel of the officers and the board of directors is the same as that of the Durant-Dort Carriage Co., from which the motor car company has purchased a five-story building, 120 by 160 feet, which has been fitted up with the necessary machinery and equipment to complete forty cars per day. At present two models, a touring car and a roadster, will be made, production beginning in February.

## Stevens-Duryea Stops Manufacturing Company May Quit the Industry

CHICOPEE FALLS, Mass., Jan. 1—The Stevens-Duryea Automobile Co., of this city, has notified all of its selling representatives that owing to the financial depression and general uncertainty of business, the further manufacture of Stevens-Duryea cars and the bringing out of new models has been indefinitely postponed. The company has on hand spare parts to the value of \$1,500,000 for the 14,000 Stevens-Duryea cars now in use, and will continue the manufacture of spare parts to meet all requirements.

Hundreds of employees of the company did not report for work yesterday morning at the factory as the result of the official notice sent out that the factory would be closed, although whether it will ever resume manufacture is questioned.

The Stevens-Duryea Co., is entirely free of debt, and owns two factories, both of which are free of incumbrances. One is a new plant completed 3 years ago and located in East Springfield, and the other is the old plant of the company in this city.

It was known early last fall that the Stevens-Duryea company was in need of ready cash to the extent of approximately \$700,000. At that time it was possible to secure this amount under certain conditions, but Frank Duryea, who owns the controlling interest in the business, preferred not to take the new capital under such conditions.

President W. H. Whiteside, and Superintendent L. H. Pierce, with some officials, are out of town, supposedly in New York

although the exhibit space at the Grand Central Palace this week allotted to the Stevens-Duryea Co. remains empty.

The feeling is general throughout this city that a close-down of this nature may eventually mean the elimination of the company from the field of motor car manufacture. It may be that the company prefers to stop now with a surplus on hand in preference to continuing the business, diminish this surplus, and lose money. When running full time the company employed 2,500 men, at the main factory in this city, and several hundred at the East Springfield branch. Of these only a few remain. The shut-down is a serious blow in this section of the country, and there is much talk of prominent men in Springfield using their influence to get the plant started again.

#### LANSDALE KRIT CUSTODIAN

Detroit, Mich., Jan. 2—Henry Lansdale, general manager of the Krit Motor Car Co., has been appointed custodian of that concern and of the Krit Sales Co., both of which filed a petition of bankruptcy last week. At the first meeting of creditors, which has been called by Referee in Bankruptcy Lee E. Joslyn, and which will be held January 18, a trustee will be appointed.

The reasons given for the present difficulties of the Krit Motor Car Co., were its inability to secure financial assistance during the last few months. This has made it impossible to keep up the production on par with the demand.



# Engineers Gather in New York for Annual Winter Meet

W. H. Van Dervoort Elected President of S. A. E.

NEW YORK, Jan. 6—Record attendance and profitable discussions have marked the sessions of the Society of Automobile Engineers, which is now holding its annual winter meeting in the headquarters of the organization in the Engineering Societies building, concomitant with the New York motor car show. The meeting opened Tuesday morning and will close tomorrow afternoon. Scores of engineers from all over the country, drawn to the metropolis by the exhibit in the Grand Central Palace, have listened to the scheduled papers and taken part in impromptu discussions, and from every viewpoint the present S. A. E. conference is regarded as the most successful winter meeting in the history of the organization.

Officers for 1915 were elected at the session this afternoon, when the following crew was chosen to man the S. A. E. bark for the coming year: President, W. H. Van Dervoort, president of the Moline Automobile Co.; first vice-president, F. R. Hutton; second vice-president, J. A. Anglada; treasurer, A. B. Cumner; counsellors for 1915-16, C. B. Rose, John Wilkinson and W. P. Kennedy; counsellor for 1915, F. M. Germane. The election of Van Dervoort to succeed Henry M. Leland was without opposition and is very popular, the head of the Moline company being an engineer of high standing.

Henry Souther, chairman of the standards committee, was elected a life member of the society today.

At the morning session tomorrow the question of the place and time for the 1915 summer meeting of the society will be up for discussion. The engineers already have been invited to make the Panama-Pacific exposition at San Francisco their mecca during the heated months. There is a faction, headed by Howard Coffin, chief engineer of the Hudson company, which favors holding the summer meeting in a more isolated place, as the Thousand Islands of the St. Lawrence, and it is probable that Coffin and his supporters will attempt to have their plan adopted.

One of the interesting papers to be read on the closing day is that by A. Ludlow Clayden, on "The European Situation as Affecting America," a most pertinent theme at the present time. Several interesting subjects were discussed by the speakers who addressed the sessions today, resumes of some of which will be found on other pages of Motor Age.

## Standards Committee Reports

New York, Jan. 5—At the meeting of the standards committee of the Society of Automobile Engineers held here today, the reports of twelve divisions were heard. In addition to these a new division has been appointed to investigate the possibilities for standardizing sprocket wheels.

Besides the work of hearing the reports of the divisions and the discussions the only other event to come before the meeting was the exhibition of a beautiful silver tray that is to be presented to Henry Souther, chairman of the standards committee, by his associates. This is a token of appreciation for Mr. Souther's valuable services on the standards committee, notably in the advance of the standards on irons and steels.

The reports heard were those of the divisions on electrical equipment, iron and steel, frame sections, lock washers, carburetor fittings, miscellaneous, ball and roller bearings, electric vehicles, standards exchange, springs, nomenclature and passenger car wheels.

In a word the keynote of progress of the various divisions are as follows:

Iron and steel—New steel list with fewer steels.

Electrical Equipment—Recommendations for standard insulation practices and definition of single and two-wire systems.

Frame Sections—Standard drops and curves of side members.

Lock Washers—Fewer sizes.

Carburetor Fittings—Standardized flanges for horizontal carburetors.

Miscellaneous—Dimensions for yoke and rod end pins.

Ball and Roller Bearings—Standard sizes.

Electric Vehicles—Ratings for mileage and capacity.

Standards Exchange—Relationship with other engineering societies.

Springs—Nomenclature of cantilevers.

Nomenclature—An outline for a standard parts list.

Passenger Car Wheels—The reduction of the number of regular tire sizes to nine in number with nine oversizes.

## MONIHAN JOINS MARION

Indianapolis, Ind., Jan. 6—Special telegram—J. G. Monihan, recently connected with the Cole company, has been appointed general manager of the newly organized Marion Motor Co., which, together with the Imperial Automobile Co., is to market the product of the Mutual Motor Co., recently headed by J. I. Handley.

The Marion Motor Co. has paid-in capital of \$100,000 and will market an entire new line of Marion cars which will consist of four and six-cylinder models at popular prices. These models will be exhibited in Chicago during the Coliseum show. It is expected the Mutual Motor Co. will take possession of its new manufacturing plant February 1 and in the meantime, the production of new models is being pushed ahead.

## ABBOTT SOLD TO CONSOLIDATED CO.

Detroit, Mich., Jan. 6—Special telegram—The Consolidated Car Co. has been organized and has purchased the assets, good will and trade name of the Abbott Motor Car Co. R. A. Palmer, president of the new concern, was 5 years general manager of the Cartercar company, of Pontiac. A. C. Knapp, who is vice-president, also is president and general manager of the A. C. Knapp Co., a body manufacturing concern.

M. J. Hammers, who is treasurer and general manager, was vice-president and treasurer of the Abbott Motor Car Co. D. E. Perry, purchasing agent, and F. E. Sangbush, service manager of the Abbott company, continue in these capacities with the new organization.

The transfer of the property from the Abbott Motor Car Co. to the Consolidated Car Co. is said to have involved properties aggregating nearly half a million dollars. E. F. Gerber, principal stockholder in the Abbott Motor Car Co., who became interested in that concern about a year ago, is not identified with the Consolidated, retiring entirely from the business pertaining to Abbott. It is stated that the Consolidated Car Co. will handle the service business on Abbott-Detroit cars and that the original corps of dealers throughout the country will be maintained.

## FIAT-ISOTTA SUIT DISMISSED

New York, Jan. 6—Special telegram—Two suits brought by the Fiat Automobile Co., Poughkeepsie, N. Y., against Isotta Fraschini Motor Co., Milan, Italy, for alleged infringements on its yoke construction on the front end of tube inclosing the propeller shaft and certain improvements in vehicle frame suspension have been dismissed without costs to either party. Both suits were filed in 1913 and involved the patent covering yoke construction and the patent covering certain improvement in vehicle frame suspension. The inventor of the first patent was Giovannina Angelli, president of the Fabbrica Italiana Automobile Turino Guido. Fornaca was the inventor of the second patent, issued December 20, 1910.

## MAKERS AT BIG BANQUET

New York, Jan. 5—Special telegram—The National Automobile Chamber of Commerce held its anniversary banquet tonight at the Waldorf-Astoria. It was said to be the largest gathering of big men among the motor car manufacturers ever held. There were 480 present. The feature of the entertainment was a series of thirty timely cartoons of the leaders in the industry.

## NORTHWAY TO BUILD AN EIGHT

New York, Jan. 5—Special telegram—Keeping step with the public demand, the Northway Motor and Mfg. Co., Detroit, Mich., is preparing to place on the market an eight-cylinder motor of the already well known V form. The decision of the company follows experimenting over a considerable period. The first motor, which will have cylinders measuring 3½ by 4½, giving an S. A. E. horsepower rating of 39.2, will be exhibited at the Chicago show.

# American Rubber Interests Send B. G. Work to England

## Representative Sails in Effort to Have British Embargo Lifted

NEW YORK, Jan. 5—Among the passengers of the Lusitania, sailing Wednesday, will be Bertram G. Work, president of the B. F. Goodrich Co., of Akron, O. Mr. Work is carrying the hopes of the American rubber industry since he will continue direct with the British government the negotiations which the embargo committee has been carrying on at Washington for the past 2 months.

When the British government first placed the embargo on shipments of crude rubber from British ports to the United States, it was regarded as of little importance by many, but others took it more seriously. A joint meeting of rubber manufacturers and importers, representing the majority of the trade, was held in New York early in November. It was recognized that spasmodic individual efforts would be of little value in dealing with an international problem; therefore, a joint committee, called the embargo committee, was appointed, consisting of George B. Hodgman, president of the Hodgman Rubber Co., Arthur H. Marks, general manager of the B. F. Goodrich Co., H. Stuart Hotchkiss, manager of the General Rubber Co. and representing the United States Rubber Co., William E. Bruyn, of L. Littlejohn & Co., representing the importers, and H. S. Vorhees, secretary of the Rubber Club of America, acting as secretary of the committee.

This committee was given a free hand and it has spared neither time nor expense in its efforts to learn the real cause of the embargo and to find means of removing it. Since that time its efforts, through the state department and the British embassy at Washington, have been most persistent.

A co-operating committee was formed of the leaders of the trade in London which worked direct with the British government, keeping in constant cable communication with the American committee. The problem appeared simple at first, but soon was found to be very complex. After 6 weeks of constant effort, in which the committee has had the best of co-operation from our state department and from Sir Cecil Spring-Rice, the British ambassador, the real issues involved in the embargo have been clearly defined.

### RUBBER IMPORTS, 4,876,900 POUNDS

New York, Jan. 1—Imports of rubber from Para to this port, from November 28 to December 22, amounted to 4,876,900 pounds. On November 28, 1,298,800 pounds came in on the steamer Stephen from Para and Manaos. On December 10, 348,100 pounds came in on the steamer Rio de Janeiro from Para. On December 16, the steamer Justin from Para and Manaos brought in 2,890,000 pounds, the largest

shipment that month. Another shipment from Para amounted to 285,300, arriving on December 22. Entries for November amounted to 5,920,000 pounds. 1,220,000 pounds were held for later shipment.

The exports of Ceylon grown rubber from January 1 to November 16, 1914, amounted to 30,339,695 pounds as compared with 21,990,065 in 1913. Great Britain was the biggest buyer with 15,940,685 pounds and the United States was next with 9,108,791.

The total exports from Malaya from November 4, 1913, to November 7, 1914, amounted to 81,866,044. Great Britain again led with 61,961,710 pounds with the United States again second with 11,857,069.

Rubber exports from the Straits Settlements from January to October, 1914, amounted to 30,046,000 pounds. The October exports amounted to 4,012,000 pounds as compared with 2,288,000 pounds in 1913.

Arrivals of guayule rubber for the 9 months ending September were 1,075,676 pounds, valued at \$440,262, against 4,675,798 pounds, valued at \$2,043,813 last year.

### MOTZ WINS IN PATENT SUIT

New York, Jan. 5—The Motz Tire and Rubber Co. has won out in a suit brought against it for alleged infringement on a cushion tire with undercut sides. Messrs. E. B. Cadwell, F. P. Johnston and F. M. Ashley, each holding a one-third interest in patent No. 887,997, issued May 19, 1908, were the plaintiffs. Mr. Cadwell was the inventor. The prayer for injunction was denied by the court. Albert T. Schups, attorney for the Cadwell interests, states that an appeal will be made.

Judge Sheppard, in his memorandum opinion, states that the resiliency of the tire under pressure is the object to be attained in the suit and that the opinion of the court is that the arrangement and shape of the tread, lobes, grooves and buttresses in the Motz tire are not anticipated in the Cadwell patent. He goes on to say:

"The tire manufactured by the Motz company is slightly different in construction to that described in its patent, but is substantially the same and its features are so arranged that new results are obtained; that is to say, the buttresses in the grooves lie one upon the other when the tire is under strain or load pressure which produces tire cushioning at all points. This cushioning effect seems to be greatly improved and the resiliency increased by use of a double lobe tread with a broken valley between.

"From ocular experiments made in court it does not appear that the Cadwell tire patent issued May 19, 1908, even with substantial changes in construction, would be capable of anything like the same utility.

"The Swinehart patents, Nos. 826,622, issued July 24, 1906, and 902,926, issued November 3, 1908, do not anticipate the Motz invention, No. 925,937, for it is seen in those patents, use was made only of a continuous tread and a slight groove inside of the tire."

### REMY GOING TO DETROIT

Detroit, Mich., Jan. 6—Special telegram—The first step in the removal to this city of the entire plant of the Remy Electric Co., now located at Anderson, Ind., has been taken in the purchase of a desirable factory property. It is the intention to begin building operation at once with the idea of eventually locating the entire plant here.

The negotiations for the bringing of the Remy organization here have been under way for about 2 months, the Detroit board of commerce being largely responsible for it. The Remy concern believes Detroit to be the logical location for its plants because much of its business is transacted with car manufacturers of the city and also much material is bought here.

The Remy factory at Anderson is said to employ about 1,500 men and it does an annual business of several millions. The capitalization is \$1,500,000. The concern's product for the motor car trade is principally magnetos and electrical equipment, while marine and stationary motors and railway electrical apparatus are also made.

It is stated that the engineering and drafting departments and the experimental laboratories will be the first to move.

### CHAMBER PREPARING ITS DEFENSE

New York, Jan. 4—Part of the defense conducted by the National Automobile Chamber of Commerce in the axle suit, Kardo vs. Studebaker, will be based upon an axle patent or patents issued 15 years ago to Leo Melanowski of the engineering department of the White Co. The patent will be cited as priority, but details of the defense are not divulged by the chamber. The Melanowski patent is said to incorporate many of the features included in the Kardo patents.

### HAS HORN EXHIBIT BARRED

New York, Jan. 6—Special telegram—Charging that a large motor-operated horn exhibited at the New York show by the Quein Electric Co. constitutes unfair competition in that it is an imitation in appearance of the right-angle design of the type L Klaxon, the Lovell-McConnell Mfg. Co. caused the horn to be temporarily removed from the show yesterday. The removal was upon a restraining order of the federal court which will hold a hearing of the case Friday.



# Former School Teacher Now President of S. A. E.

Advance of W. H. Van Dervoort in the Engineering Field



By J. C. Burton

IN the election of William H. Van Dervoort, scion of the Dutch burghers who first settled in the Mohawk valley, and head of the Moline Automobile Co., to the presidency of the Society of Automobile Engineers, the nerve-soothing weed, popularized among the Caucasians by Sir Walter Raleigh, receives the K. O. punch. Tobacco never has touched the lips of the new wielder of the S. A. E. scepter, all claims to the contrary, made in advertisements by the makers of Tuxedo and Prince Albert, notwithstanding.

## Dutch, But Does Not Smoke

Truly, a non-smoking Van Dervoort is a paradox. Speak his name and you hear the flap of windmills and the swish of water in canals. Such abstinence by the bearer of such a name is contrary to tradition and at variance with the common idea of a Dutchman, wearing wooden shoes and puffing on a long-stemmed pipe. Still, it can be proven by deductive reasoning that Van Dervoort, Dutch as his name implies, has never paid court to Lady Nicotine. If you would be convinced, attend:

All Dutchmen wear wooden shoes and smoke pipes;  
But Van Dervoort does not wear wooden shoes;  
Therefore, Van Dervoort does not smoke a pipe.  
Q. E. D.

Van Dervoort is a school teacher. In fact, had he less embonpoint, he might qualify as the Ichabod Crane of the motor car industry, for he is as Dutch and as tall as the immortal hero of Washington Irving's tale. But he is not lean or lank. He has the build of the cleanup hitter and the smashing half-back, the physique of Tris Speaker or Willie Heston. He is power personified, this pedagogue president of the S. A. E.

Van Dervoort first taught the young idea how to shoot 26 years ago. After preparing at the state normal school at



W. H. Van Dervoort

## President S.A.E

Ypsilanti, Mich., he secured his Bachelor of Science degree in the mechanical department of the Michigan Agricultural College, at that time not as formidable as an upsetter of football dope as it is today. The young graduate—he was only 20 years of age—was offered a position as instructor in mechanical engineering at the M. A. C. and accepted. He was a teacher not from choice but from necessity. His ambition was to enter the manufacturing field. He laid plans for the day when such an ambition might be realized, spending two of the long winter vacations studying factory conditions in New England and Europe and two other winters at Cornell university, from which he received a M. E. degree in 1893.

While a resident of Lansing, the site of the Michigan Agricultural College, Van Dervoort made the acquaintance of R. E. Olds, who at that time had just started to experiment with gasoline-driven engines. The pioneer builder of the Oldsmobile, with his father, had a small shop on the Grand river, where they were making stationary steam engines with porcupine or quill boilers and using John D. essence as a fuel. Van Dervoort watched the work of the Olds with interest and spent many an hour with them, discussing deep questions of great moment to future motorists.

In the early fall of 1893, Van Dervoort

accepted the position of assistant professor of mechanical engineering at the University of Illinois. During his 6 years stay at the college made famous by Jake Stahl, George Huff and Robert Zuppke, he was a contributor to American Machinist, Machinery and other scientific journals and started the preparation of "Modern Machine Shop Tools and Methods," published in 1901 and still used as a text book in several universities. Just before leaving Urbana, he included gasoline engine design in his course in mechanical engineering, having a premonition that the gasoline engine was destined soon to be a mighty factor in American industrial life.

## Invests Savings in New Industry

So great was his faith in the future of the gasoline engine that Van Dervoort backed it with his savings of 10 years, \$5,000, in 1899, and established a factory at Champaign, Ill., for its manufacture. O. J. Root, a chum of Michigan Agricultural College days and assistant superintendent of the Watertown Steam Engine Co., was his partner in the enterprise, which was known as the Root & Van Dervoort Engine Co. There was a demand for their product, gasoline stationary engines. The company, capitalized for \$10,000 at the outset, prospered. A larger plant was imperative and in 1901 the company moved to East Moline, Ill., where was built up a business



that now employs about 800 men and produces 24,000 engines annually, used principally for agricultural work and marketed through the John Deere Plow Co. since the lean days when the firm was born. The two partners went after the foreign trade and now do a large export business, especially in South America and Australia.

While accruing more money in a day than the average school teacher harvests in a year, the former savant of the University of Illinois interpreted the wheeze of the early gasoline motor as a note of promise and investigated the possibilities of the horseless carriage.

"Back in 1897, I went to Lansing for a visit and while there went to the Olds shop," Van Dervoort told the writer. "The first thing that struck me when I entered the door was twenty wooden wheels, equipped with solid rubber tires, standing against the wall. My curiosity got the better of me and I asked Olds what the wheels were for. His answer almost bowled me over. 'I am making motor cars,' he said. I did not voice my skepticism, but my looks must have told him that I regarded him as a hopeless dreamer.

"Three years later, however, I went to Europe to consult on some engineering work and while in France became inspired by gasoline-driven motors. At that time the United States was not yet in the thrall of the Standard Oil Co., and the

few cars that were blocking traffic in this country were heavy, impractical machines, propelled either by electricity or steam. Olds and the Apperson brothers still were experimenting with gas cars and had not gotten very far. The motor tricycles and voiturettes that I saw skimming over the boulevards of Paris opened my eyes, however, to the possibilities of the gasoline-driven vehicle and upon my return to America I was a convert to the gas car."

#### Buils Motor Cars in 1905

Van Dervoort was not attracted to the new American industry until 1905, when with Root, he formed the Moline Automobile Co. to manufacture a motor car of collaborated design. The first plant employed between twenty-five and thirty men and the output for the first year was only fifty machines. The brake of conservatism always has been applied to the manufacturing wheels of the Moline company. Its present annual production is 1,000 cars. Gamblers' blood flows neither in the veins of Van Dervoort nor Root. They always have played safe, never burned their bridges behind them. As a result of such a policy, their company is a small but solvent concern.

Above all else, Van Dervoort is a worker, a human dynamo. He has but one hobby and that is fishing. That Izaak Walton had nothing on him is his own confession. Whenever he seeks recreation, he takes his rod and flies, goes to the streams

of Wisconsin or to his summer home at Lake Delevan and casts for bass. Although he has fished at Catlina, he is not eligible for membership in the Tuna Club. Hooking big fish is not his specialty.

The new president of the S. A. E. is a student of trade and manufacturing conditions. Two years ago, he made an extensive tour of South America and spent much time in Chili, Argentine and Brazil to learn the needs of our Latin neighbors.

"I got an insight into the trade conditions on that trip that I could not have obtained in any other way," he said. "The talk of a big market for our goods in South America is exaggerated in my opinion. What South America needs now is money and credit. It is buying only the necessities of life. This is the time for our manufacturers to lay the foundations for an increased South American trade, but it is too early yet to attempt to flood the market with our products."

As a manufacturer of motor cars, Van Dervoort always has been a staunch supporter of stock car reliability runs and tests, the Moline having been a participant in the Glidden and the reliability runs of the Chicago Motor Club before these classics were shoved in the dark dungeon of oblivion. During his administration as president of the S. A. E. he will prosecute the standardization campaign, for he believes that this is the most fertile field in which the society can work.

## Small City Dealers Argue Against Local Shows

### Bloomington Believes Present Conditions Are Against Such Exhibitions

**B**LOOMINGTON, Ill., Jan. 4—Dealers here are inclined to abandon the annual motor car show which has been held each February for the past 5 years, and it is said that a number of other cities of similar size in Illinois and adjacent states are considering similar action.

There has been a remarkable transformation in the industry in Bloomington in the past 5 years and probably the situation here is true of many other inland cities. Five years ago, the motor car agencies were largely conducted in remodeled livery barns or in makeshift structures which were never intended for motor car displaying or repairing. At that period there was urgent need of an annual show, where the various makes of cars could be displayed adequately and the proper attention be given to them.

Now, this has all been changed. The progressive dealers have in many instances erected buildings of large size and of several stories, designed especially for the display and repair of cars, and the proprietors now are able to put on a daily show, instead of one a year. With the coming of the pretentious garages has disappeared the curbstome agents, to a considerable extent at least. In former years these curbstome agents could be counted

upon to co-operate in putting on the annual show, as this was their best opportunity to display the car they represented. With the coming of the pretentious garages and the elimination of the dealers without show rooms, there is less demand for the annual exhibition, which has caused local dealers to figure on quitting their show.

Many dealers think that the smaller cities should rally around the Chicago show.

#### TO RECOGNIZE DR. CARHART

Milwaukee, Wis., Jan. 2—Just as the state of Wisconsin was about to recognize the achievement of Dr. J. W. Carhart, inventor of the motor car, in a substantial manner by legislative appropriation, the man who only recently began to receive the credit for designing the first machine of the self-propelled type, died in San Antonio, Texas. About 6 months ago, when a picture of the old Carhart car was resurrected in Racine, Wis., a movement was started to have the 1915 Wisconsin legislature recognize the achievement in a financial way, because Dr. Carhart never had attempted to claim any former bounties. Men interested in motor-car development started a campaign among mem-

bers of the legislature, which promised to result in a large money appropriation in January or February for the benefit of the aged inventor. It is now believed that recognition will be afforded by the erection of a monument to his memory.

#### CALIFORNIA SETS SPEED LIMITS

Los Angeles, Cal., Jan. 2—By the decision of the appellate court which fixes the speed limit in all but chartered cities is one of the greatest victories ever scored by motorists in this state and gives California the first uniform speed law of any state in the union. Coming as it does, just before the opening of the two great expositions, the great number of eastern motorists touring California in 1915 will not be pestered by the small-town speed cop, which has been a menace to motoring throughout the state, and especially in Southern California.

No longer can the village trustees set a 10-mile speed limit and enforce it for the benefit of the town improvement fund. With a 30-mile limit on the county roads and 20 miles in the built-up districts of the larger cities, touring conditions become more enjoyable. In the business districts of the larger cities the limit is as low as 15 miles an hour, but no lower.

# Reeves Finds Motor Industry Healthy

## Accurate Statistics Given by C. of C. Manager

NEW YORK, Jan. 4—The motor car industry and its allied trades are in a remarkably healthy and prosperous condition, according to comparative statistics prepared by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, Inc. The 42-centimeter shells of General Depression have not made a single dent in the industry, according to Reeves, and during the past year the various plants have grown as rapidly as in the other years of the last decade when the industry earned the name of America's industrial progeny because of its phenomenal development.

According to Reeves' figures, there has been an increase in the total number of manufacturers over the last 2 years, but a decrease compared with the number at the end of 1911. To offset this reduction in the total number of makers, there is a large increase in the amount of capital invested, just how much there are no reliable figures to show. This increase in the total capitalization indicates that the various companies are more firmly fortified financially than before.

There were between 400 and 500 makers of motor vehicles listed last year. Of these, 170 built gasoline passenger cars, 245 gasoline commercial cars, 77 cyclecars, 27 motor-driven fire apparatus, 18 electric passenger cars and 24 electric commercial vehicles.

### Increased Production the Rule

Increased production was the rule in the majority of the plants during the past year. For the fiscal year ending June 30, 1914, Reeves estimates the total output of motor vehicles at more than 500,000, including 30,000 trucks. This is an increase of 2,600 per cent in 10 years, the production in 1904, according to the government census being 22,830, and an increase of 475 per cent in a half decade, since the census showed an output of 126,500 cars in 1909.

Since more than half the cars made in 1914 had an average value of approximately \$1,700 and the remainder an average value of \$500, the total valuation of the motor vehicles built during the past year is about \$490,000,000. In 1904, the census reported the valuation of the output at \$30,000,000 and in 1909 at \$164,203,500.

The makers of motor cars have been as sincere in their attempts to make it possible for the common people to own a car as the political orators are hectic to defend that much persecuted class of individuals, for motor cars have gradually become lower in price and the average cost reached a low water mark of about \$1,000 in 1914, according to Reeves' estimates.

There was a gradual increase in the average price of motor cars up to the year 1907 but since then there has been a steady reduction. This rise and fall is reflected in

the following scale of average prices of all cars made and sold by the companies comprising the Association of Licensed Automobile Manufacturers and its successor, the present National Automobile Chamber of Commerce:

|      |              |
|------|--------------|
| 1903 | .....\$1,134 |
| 1904 | .....1,351   |
| 1905 | .....1,617   |
| 1906 | .....1,866   |
| 1907 | .....2,130   |
| 1908 | .....1,935   |
| 1909 | .....1,709   |
| 1910 | .....1,611   |
| 1911 | .....1,805   |
| 1912 | .....1,582   |
| 1913 | .....1,517   |
| 1914 | .....1,000   |

The production of all gasoline passenger cars for 1914, classified by list prices, is estimated in percentage as follows: Less than \$500, 5.4 per cent; \$500 to less than \$1,000, 57.3; \$1,000 to less than \$1,500, 17.2; \$1,500 to less than \$2,500, 15.8; \$2,500 and over, 4.3.

American makers also profited by an increased export trade in 1914. During the fiscal year ending June 30, the United States exported 29,090 motor vehicles valued at \$26,574,574; parts valued at \$6,624,232; engines valued at \$1,391,893, and tires valued at \$3,505,267, making a grand total of nearly \$38,000,000.

Exports of motor cars and trucks and parts have increased as follows:

|      |                   |
|------|-------------------|
| 1907 | .....\$ 5,502,241 |
| 1908 | .....5,277,847    |
| 1909 | .....5,992,200    |
| 1910 | .....11,190,220   |
| 1911 | .....15,509,229   |
| 1912 | .....25,657,294   |
| 1913 | .....31,253,533   |
| 1914 | .....33,198,806   |

During the same period imports of foreign cars and parts have been as follows:

|      |                 |
|------|-----------------|
| 1907 | ....\$4,842,279 |
| 1908 | ....2,991,039   |
| 1909 | ....3,679,134   |
| 1910 | ....3,837,084   |
| 1911 | ....2,250,759   |
| 1912 | ....2,438,325   |
| 1913 | ....2,023,207   |
| 1914 | ....1,432,576   |

A barometer of increased prosperity is the freight shipments. In the first 10 months of 1914, freight car shipments of motor vehicles reported to the National Automobile Chamber of Commerce by its members reached a total of 94,736 cars, as compared with 77,831 cars for the corresponding period in 1913.

There are more cars on the highways than ever before. More than 1,548,000 motor vehicles were registered officially with the secretaries

of state, highway and motor vehicles commissions of the various states up to July 1, 1914. These are annual registrations with duplicates eliminated. The states having 50,000 or more registered cars, with the respective numbers, are as follows:

New York, 140,653; Illinois, 115,000; Pennsylvania, 109,174; California, 107,173; Ohio, 105,000; Iowa, 88,557; Texas, 70,000; Michigan, 65,517; Massachusetts, 64,717; Minnesota, 61,950; Indiana, 56,500; Nebraska, 55,989; New Jersey, 50,000.

### \$10,000,000 in Tag Fees

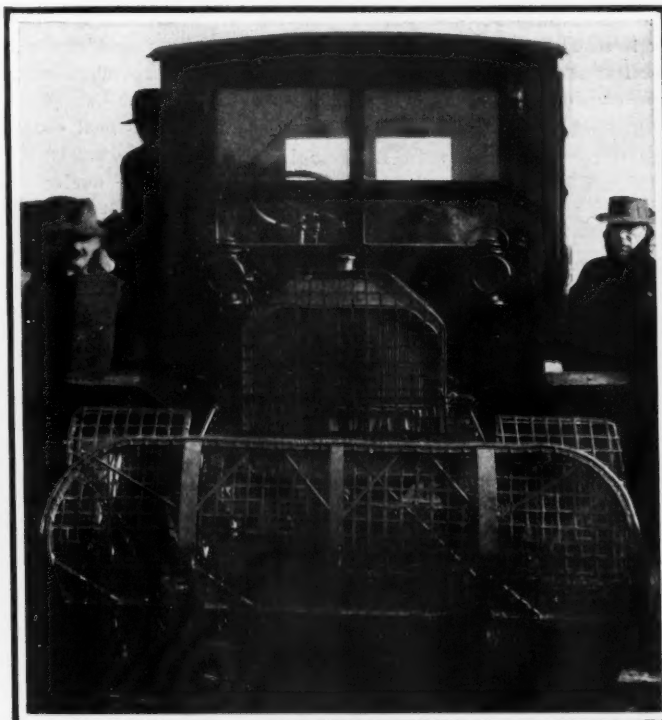
The fees collected in 1914 amounted to approximately \$10,000,000. Practically all of this sum went for highway repairs and reconstruction. About 275,000 drivers and chauffeurs were licensed by the various states during the first half of 1914.

The annual report of Michigan department of labor for 1913 shows the motor car industry ranks first in state in number of employees engaged. In 1913 there were forty-two motor car makers in the state. They employed 47,474 persons. The total number of factories, retail stores, garages, repair shops and other establishments related wholly or in part to motor vehicles, parts and accessories in the state was 582 last year, or 5.7 per cent of all the industrial establishments, and they employed 90,673 persons, or 22.2 per cent of all wage earners in the trade.

### Truck Makers Prospering

According to Reeves' statistics, the manufacture of commercial motor trucks has increased in a more rapid ratio than the passenger car business, the production more than doubling annually during the last half dozen years. There are now estimated to be about 100,000 business vehicles in use in America.

The output of motor trucks during 1914,



CHICAGO STARTS SERIES OF TESTS OF MOTOR TRUCK FENDERS



classified by load capacity and given in percentage, is as follows:

Less than 1 ton, 37.5 per cent; 1 ton to less than 2 tons, 32.5; 2 tons to less than 3 tons, 13; 3 tons to less than 5 tons, 13; 5 tons and over, 4.

#### POPE SALE AUTHORIZED

Hartford, Conn., Jan. 4—Judge E. B. Gager, of the superior court of Hartford county, has authorized Colonel George Pope, receiver of the Pope Mfg. Co., to accept the offer of the Pratt & Whitney Co. of \$300,000 for the main works of the Pope company on Capitol avenue.

It is rumored that the United States Tire Co. would like to possess the so-called west works of the Pope company, which stood idle for years under the ownership of the United States Steel Co., and subsequently bought back by the Pope interests and later allowed to pass into disuse. This is close to the United States shops.

Alterations now are in progress at the former plant of the Columbia Motor Car Co., acquired by the Billings & Spencer Co. For some time past the Billings & Spencer company has been putting the works in shape looking towards ultimate occupancy. Because of the general objection to the forge department of the company, at present located in a residential section, the move of this portion of the present plant to the new quarters is logical.

#### WINTON USES AIR STARTER

In the directory of American motor car manufacturers, published in Motor Age last week, credit was not given the Winton for being equipped with an air-starter. The company is one of the pioneers in the adoption of self-starters.



DUMMY OF YOUTH AFTER BEING STRUCK IN FENDER TEST

## Chicago Trying Out Truck Fenders

### Spectators Find Fault With First Tests

CHICAGO, Dec. 30—The city of Chicago today started a series of tests on safety vehicle fenders to determine which ones conform to the specifications set down by the fender committee composed of Henry A. Allen, O. C. Duryea and Hugh Borland. More than 100 dealers from motor row, most of them members of the Chicago Automobile Trade Association, witnessed the tests.

The test is the initial one of a series, the outcome of the recent publication of a city ordinance, as follows:

Section 2650½. It shall be unlawful for any person, firm or corporation to use and operate within the city of Chicago any motor car or truck for the purpose of conveying therein bundles, parcels, baggage, or wares, merchandise or other similar articles, unless said motor car or truck is provided with a fender as in the case of street cars operated and used within said city, of such design as shall meet the requirements for uniform tests to be made under the direction of the clerical, mechanical and inspection bureau of the department of police and shall be approved as efficient by the general superintendent of police.

Section 2. Upon being duly approved and published, this ordinance shall take effect and be in force from and after March 1, 1915.

Not one of the spectators, save the city officials and the representatives of the fender company, made any favorable comment on the test, and it was quite obvious that no definite or useful data could be obtained which would make it imperative that the fender ordinance be enforced on the data specified.

#### Leather Dummies Used

In the tests conducted today three leather dummies were used and each dummy was put through a number of different tests. Those in charge have outlined a series of something like 120 different tests for each fender, using three different dummies, one representing a child, another a youth and a third a full-grown man. Each dummy is placed in a number of different positions, there being something like thirteen of these, and the vehicle strikes the dummy at various speeds ranging from 3 to 15 miles per hour.

In today's tests the dummy was invariably carried along the ground in front of the fender in all the tests above 7 miles per hour. At 3 miles per hour the dummy was struck and thrown in front of the fender, but the driver knowing the dummy was

about to be hit, stopped the car before it again reached the false man. In other words, if a real man were struck at 7 miles per hour or more he most likely would be thrown down by the fender, in all probability his legs broken by the impact, and then scraped along the ground until the car was stopped. In the tests the driver knows he is going to strike the object and hence he can stop within a short distance. In one instance the dummy is made to face the vehicle. This seems an unfair test, since a man facing a vehicle naturally will see it and hence move out of the way.

On the whole, the tests were in no sense pleasing to the majority of the spectators, most of whom were men directly interested, members of the local trade association, truck owners, etc.

The city proposes to continue the tests with different makes of fenders and hopes that by March 1 there will be a sufficient number passed upon so that manufacturers can be producing and every commercial car equipped. The dealers and others directly interested think otherwise, however.

#### TWOMBLY DEBUT POSTPONED

New York, Jan. 4—The Twombly 20-cents-a-mile, 2-passenger taxicab, which it had been planned would be placed in service January 1 in New York city by a large cab company, will not appear on the streets until March 1 and then under the management of W. Irving Twombly, the maker.

Twombly has formed the Twombly Taxicab Co., with \$300,000 capitalization under the New York laws, and is preparing to build 500 cars. About twenty-five of these will be ready for service March 15. He has also added a cab which will carry four passengers and will build on the proportion of 80 per cent for two passenger and 20 per cent for four passenger. This, he states, having been found to be the average ratio in taxicab service. The rates will be two passengers, 25 cents the first mile and 5 cents a quarter thereafter; four passengers, 30 cents the first mile and 7 cents a quarter thereafter.

#### OVERFLOW FOR CHICAGO SHOW

Chicago, Jan. 4—Two buildings to the immediate south of the Coliseum annex, one of which was part of the show proper last year, are offered by Edwin Greer & Co. to those who cannot get space in the main show. Each building is 50 by 165 feet, and Greer claims that already he has booked a Ford exhibit, Sphinx Motor Car Co., Cochran Pipe Wrench Co., Great Western Mfg. Co., Highland Body Co., Grau Special Ford Shock Absorber Co., Hennes Sales Co., Fowler Lamp and Mfg. Co., Frederickson Patent Co., Universal Pump Co., Manufacturers' and Distributors' Co.





AN AEROPLANE VIEW OF ARMORED CARS IN A BELGIAN GARDEN NEAR DIXMUDE

## War Orders Keep French Plants Busy

### Not Enough Workmen Available

By W. F. Bradley

**P**ARIS, Dec. 10—The "Men Wanted" sign, rarely displayed even in times of peace, is now to be found on the doors of at least half the motor car factories in the neighborhood of Paris. During the last few days there has been a big inrush of work and the heads of the various car factories now are faced with the problem of getting enough men to execute the orders they have in hand.

Practically all the work has come from the French and Belgian army authorities. Big orders have been placed for commercial vehicles; the factories specializing in trucks never have been slack, but now they are busier than at any period since the outbreak of the war. A big use also is being made of touring car chassis as light trucks.

#### Orders from Belgium

Many of these orders are for the Belgian government, for this nation long has made use of private-car chassis for transporting goods. The French, however, are also finding the value of 16-horsepower chassis, fitted with pneumatic tires, carrying a covered platform body, and capable of moving  $\frac{1}{2}$ -ton loads. These are the ordinary touring car chassis with rather heavier springs, a bit lower gearing and less inclined steering column. Convoys of ten or twelve vehicles of this type, all of one make and equally loaded, can travel with the regularity of a train bringing goods forward with greater rapidity than is possible with ordinary trucks.

The greatest amount of work, however, undertaken by the French motor car factories is the making of shells, gun fittings,

and aeroplane parts. As all the factories are within a radius of 3 miles of the city of Paris, they are very conveniently situated for this work. Renault, de Dion-Bouton, Darracq, Unic, Delage and Delaunay-Belleville are particularly busy on this class of work, some of these firms having received an unlimited order and many of them aiming to turn out 1,000 shells a day. The greatest demand is for lathe men, although there also is plenty of work for the hardening departments. Every

available man is snapped up as soon as he is liberated from military obligations.

In certain cases machinists are set free from military duties in order to work in the factories. Government inspectors see to it that these men are actually employed on army work, and not on the private business of the company. When men are released from the army they have to return to the factory originally employing them. Others released because of some physical infirmity unfitting them for service in the field, are free to work where they wish, and in order to secure such men the motor car factories are increasing the rate of pay.

#### Easing Up on Regulations

There also is a certain development in the pleasure car situation. Although there still is an official restriction on the exportation of motor cars, the authorities now are allowing cars to go out of the country when not required for military purposes. One cross-channel route to England is working regularly on this class of transportation. The result is that cars are being sent to England and then shipped abroad to various destinations. The volume of business is not great, but it is as much as the factories can handle with their present limited staffs. It appears that orders for high-grade cars were not generally cancelled by customers outside Europe and deliveries are now being made after a 3 months' delay.

There is an important order awaiting the French factories for the replacement of the 1,100 motor buses taken off the Paris streets when war broke out. The new design for these buses has been approved, and comprises a number of body changes, but very few modifications in the chassis. This order cannot be given out to foreign firms, and as the factories capable of executing it are too busy with army production, it is being made to stand over until



SOLVING THE DRINK PROBLEM. MAURICE SIZAÏRE CARRIES 5 GALLONS OF WINE ON THE RUNNING BOARD

a more convenient moment. In the meantime Parisians have to find other means of locomotion.

The knowledge that motor car orders have gone to American firms does not worry French car manufacturers. It is recognized that if orders have been sent abroad it is because they cannot be executed at home and that the arrival of these vehicles will not have any influence on the normal trade of the country under peace conditions. If America can help to make up the French and Russian deficiencies, there also is the possibility that it may attempt to do the same for Germany.

#### English Criticisms

Some of the English technical papers appear to be peeved at the importation of American trucks into the seat of war. Under the heading "Truck Trash from the U. S. A.," Commercial Motor declares that the experience of the allies when they use these trucks will be simply appalling. The article claims that something should be done to safeguard the interests of the allies against unnecessary losses both of material and lives and insist on a rigid examination so that no American junk shall be allowed to pass through.

The cry appears to have been prompted more by a fear that America may secure a hold on the European market than by the certainty that junk is on its way across the Atlantic. Under such circumstances as the present there is a temptation for all owners and manufacturers to turn over all their least satisfactory machines to such a willing buyer as the army. It has been done by France and by England. Yet there is no reason to suppose that the high-class American firms having secured European contracts will send over machines in any way inferior to those produced in Europe.

The war now has settled down to such business-like lines that it ought to be impossible for junk to get in, while several of the characteristics of American trucks make them more suitable for winter war conditions than the highly specialized European trucks designed for running on city streets or perfect tar macadam. At the



AN ENGLISH TRUCK BRINGING A GUN INTO BELGIAN HEADQUARTERS AT FURNES

outbreak of the war scores of unsuitable vehicles were shipped across the channel without examination and after delaying the convoys were left to decorate the country side. Unscrupulous French dealers, too, found means of passing their broken down trucks into the army garages, from which they passed to the junk heap, whereas they ought to have gone there direct. At the present time such tactics are impossible and the machines must be up to standard, whether they are supplied by France, England or America.

#### Repairing Many Cars

The repair departments of all the French car factories are working under high pressure. There are hundreds of touring cars which have covered 200 miles for 100 consecutive days. Some have done more, for it must be remembered that army cars travel as much by night as by day and are only held up to allow the driver to obtain food and sleep. An unskilled or rough driver probably will wreck his machine under such conditions. A clever driver will keep his car going all the time, but at the end of 20,000 miles it will have need of

a factory visit. It is on such work that the repair departments are now busy.

Drivers obtain 2 or 3 days' leave of absence in order to make a quick trip to Paris and there have the repair work carried out with the last possible delay.

Tire economy is not considered at the present time. Shoes are run until they burst, then left on the roadside. Partly-worn casings which under ordinary circumstances would be carried on the car until they could be given to the repair department are thrown away for lack of carrying capacity and for lack of a tire repair department to treat them.

Another of the little wastages is gasoline and oil tins. French gasoline is delivered in 1-gallon tins, and English gasoline in 2-gallon vessels. Every driver carries from one to ten of these cans on his car as a reserve supply, and as he has no means of refilling them, he almost invariably throws them away. As each can is worth 15 cents, the wastage, multiplied by thousands, would be considered important in times of peace; under war conditions it is a negligible quantity.



RED CROSS CARS AT NIESPORT, BELGIUM. AN AMERICAN OVERLAND IS IN THE FOREGROUND



# U. S. Supreme Court Upholds Maryland's Motor Law

## State Can Collect Tax from District Motorist

WASHINGTON, D. C., Jan. 5—Special telegram—The constitutionality of Maryland's motor car law, imposing a tax on Washington motorists, today was upheld by the supreme court of the United States in an opinion rendered by Justice McReynolds, which was concurred in by the entire court. The case was that of Hendrick vs. Maryland. Justice McReynolds, in the decision of court affirming the decree of the lower court said:

If the statute is otherwise valid, the alleged discrimination against residents of the District of Columbia is not adequate ground for us now to declare it altogether bad. At most they are entitled to equality of treatment, and in the absence of some definite and authoritative ruling by the courts of the state we will not assume that upon a proper showing this will be denied.

The record fails to disclose that Hendrick had complied with the laws in force within the District of Columbia in respect of registering motor vehicles and licensing operators or that he applied to the Maryland commissioner for an identifying tag or marker—prerequisites to a limited use of the highways without cost by residents of other states. He cannot therefore set up a claim of discrimination in this particular.

Only those whose rights are directly affected can properly question the constitutionality of a state statute and invoke our jurisdiction in respect thereto.

In the absence of national legislation covering the subject a state may rightfully prescribe uniform regulations necessary for public safety and order in respect to the operation upon its highways of all motor vehicles—those moving in interstate commerce as well as others. And to this end it may require the registration of such vehicles and the licensing of their drivers, charging therefor reasonable fees graduated according to the horsepower of the engines—a practical measure of size, speed and difficulty of control.

The prescribed regulations upon their face do not appear to be either unnecessary or unreasonable.

In view of the many decisions of this court there can be no serious doubt that where a state at its own expense furnishes special facilities for the use of those engaged in commerce, interstate as well as domestic, it may exact compensation therefor. The amount of the charges and the method of collection are primarily for determination by the state itself; and so long as they are reasonable and are fixed according to some uniform, fair and practical standard they constitute no burden on interstate commerce.

There is no solid foundation for the claim that the statute directly interferes with the rights of citizens of the United States to pass through the state, and is consequently bad.

The statute is not a mere revenue measure and a discussion of the classifications permissible under such an act would not be pertinent. There is no error in the judgment complained of, and it is accordingly affirmed.

### AFTER UNIFORM TOLL RATES

Philadelphia, Pa., Jan. 1—Motorists from all sections of Pennsylvania have been requested to attend a meeting to be held in Lancaster on January 13, when motor clubs of Lancaster and Delaware counties will present a petition to the state public service commission to have established a uniform and reasonable rate of tolls for all toll roads and privately-owned highways in this state. At the meeting a formal complaint will be drawn up and preparations made to present to the commission at a public hearing evidence demonstrating that extortionate charges are exacted at principal points on the toll roads in Pennsylvania. Joseph H. Weeks, chairman of the road committee of the Pennsylvania Motor Federation, has charge of the matter.

The complaint specifically designates the Lancaster pike from this city and the Columbia, Pa., bridge over the Susquehanna river, on the direct road from Philadelphia to Harrisburg and extensively frequented by motorists. Concerted action in protesting to motor car organizations of the state has been frequently made by motorists of this city and nearby sections, urging a movement to have the toll charges reduced. It is claimed that it costs more to travel by motor car from this city along the lower end of Lancaster pike than it does by train.

The commission will be asked to establish a uniform rate classification on the same basis as the motor car registration fees now charged by the state, the tolls to vary according to the number of cars driven over each particular toll road, so that each such road would receive sufficient revenue to be kept in repair and at the same time give a fair return to the owners.

### BILLS "MADE IN U. S. A." SHOW

New York, Jan. 4—A "Made in the U. S. A." industrial exposition to be held at the Grand Central Palace, New York, March 6 to 13, is the latest development in the nation-wide movement to popularize and permanently establish the "Made in the U. S. A." slogan or national trademark and increase American industry and trade.

This exposition is designed to show American-made and American-grown products in practically all branches of business and it is held at a time of the year when New York is the mecca of mercantile buyers from every section of the United States and this army of merchants is to be supplemented this year by a large number of South American and other foreign buyers who have heretofore gone to Europe at this same season.

The exposition has been placed under the management of the National Exposition Co., of which Harry A. Cochrane is president, with executive offices in the Fifth Avenue building, New York.

### OHIO'S 1914 ROAD WORK

Columbus, O., Jan. 4—Advance sheets of the annual report of James R. Marker, Ohio highway commissioner, which have been made public, show the wonderful progress made by the department during the year 1914. During the year the Buckeye state forged ahead to a point among the front rank of states in the percentage of highway improvement. The report shows that 550.8 miles of highways were contracted for during the year.

Waterbound macadam is one of the favorite plans of improvement by most of the counties coöperating with the highway

department. There were 196.62 miles of macadam highways constructed during the year. Brick construction comes next with 169.42 miles and concrete construction with 112.87 miles. Other materials used were gravel macadam and wood block.

Most of the work for the fiscal year was awarded August 4, when \$2,000,000 worth of road construction was provided for. This construction will start early in the spring.

### VIXEN REACHES THE COAST

Los Angeles, Cal., Dec. 28—O. G. Clossen, driving a Vixen cyclecar, reached Los Angeles yesterday after crossing the continent from Milwaukee in the small machine. Clossen, it is claimed, is the first cyclecar pilot ever to reach Los Angeles from the east without shipping his car a large percentage of the distance.

Clossen left his home city October 27 and followed the Lincoln highway to Omaha, thence over the Santa Fe trail to Dodge City and from there over the Border land route through Texas, Arizona, the Imperial valley and San Diego to Los Angeles.

The cyclecar pilot reported the roads through Texas in poor condition owing to the floods, but the remainder of the trip was without incident although it was hard going for the small car.

### CARLSON BREAKS ROAD RECORD

Riverside, Cal., Dec. 31—Another road record was established by the Maxwell this morning when Billy Carlson, member of the Maxwell racing team, piloted the little Phoenix road racer, Maxwell 25, from Los Angeles to Riverside in 56 minutes, 25½ seconds, establishing an inter-city record for the 58-mile course that should stand for some time to come.

At Ontario, the Phoenix race course was forsaken and the Maxwell was turned toward Riverside over the lately completed boulevard through Wineville, making fast time all the way. Even over the 3-mile rough stretch between Pomona and Ontario, Carlson made better than 40 miles an hour.

After catching the time at the start, the timers and checkers at Riverside went into the Glenwood for breakfast, believing that the best time Carlson could possibly make would be 1 hour and 15 minutes, but there were given a surprise. As they came out of the hotel to go to the finish line at Seventh and Main streets, Carlson drove into the hotel grounds, a block beyond the official point and as the officials were all together, the Maxwell was checked in directly in front of the Glenwood door and if any other cars attempt to lower Carlson's time, the official route



will be from the Los Angeles city limits to the hotel here.

Among the men who acted as timers and checkers for Carlson at Riverside and Los Angeles, were Harry Lord, A. T. Smith, Earl Cooper, the Stutz pilot; Lawrence Hutching, George Jimenez, Charles Miller, Frank A. Miller, Louis Schwabe and R. E. Kohne.

#### MARMON IN HIGH GEAR RUN

New York, Jan. 2—Shortly after the show opened today, Walter Scott, of Baltimore, Md., drove up to the Grand Central Palace in a six-cylinder Marmon, completing a trip from Baltimore carrying six passengers, the trip being made on high gear exclusively.

The run was made in 6 hours 5 minutes actual running time. From Market street, Philadelphia, to Jersey City, a distance of 97 miles, the time was 2 hours 45 minutes.

Practically the entire distance was over snow covered roads and the trip might have been even faster had not a detour over a stretch of road in Maryland been necessary. Throughout the entire run the driver did not shift out of high gear once until the ferry at Jersey City was reached, even in spite of the deep snow.

#### BOILLOT TOO DARING FOR JOFFRE

New York, Jan. 4—According to a cable to the New York Times, General Joffre has selected a new chauffeur, a reservist named Edmond Theodore from Niort, who passed his conscript service as a naval mechanic. His former pilot was Boillot, the racing driver, whose eagerness to gratify the general's fondness for speed caused him to take unnecessary risks. After one particularly hairbreadth escape, General Joffre, without reproaching Boillot, quietly announced his intention of making a change.

#### MUST CHARGE LEGAL FARE

New York, Jan. 4—The taxicab companies in this city have lost their fight for a private taximeter rate as against the legal fare set by the aldermen today when Mayor Mitchell approved the amendment to the ordinance putting every vehicle operating with a meter under the public hack law. The terms of the amendment mean that the owners either must operate the cars at the legal rate or take the meters off their machines.

#### BALK ON HEADLIGHT LAW

Philadelphia, Pa., Jan. 1—Despite a recent ruling of the Fairmount park commissioners against the use of headlights on motor cars at night in Fairmount park, many drivers will use them in defiance of the statute, more as a means of securing some modification of the regulation than any desire on their part to deliberately violate the law. The primary object of the suppression of headlights was to reduce the number of collisions and accidents that have been attributed to the

blinding searchlights on cars, but motorists insist that a car thus equipped is not nearly as dangerous as driving one with insufficient illumination, and further assert that they won't risk the danger of traversing the darker stretches of the park drives without the full illumination.

Though violations of the park regulation have been numerous, no one has been arrested as yet to furnish a test case and give the matter an airing. Whether the offenders have eluded the eagle-eyes of the guards, or traffic being light in winter and the weather stormy, the infraction of the rules has been overlooked, is an open question.

An amendment to the rule regulating night traffic of carriages and horse-drawn vehicles in the park requires all such to carry two sidelights instead of one, as heretofore.

#### DEALER BLAMES BANKERS

New York, Jan. 4—That a different attitude on the part of the bankers in his section of the country would aid motor car dealers greatly is the statement of John P. Bleeg, who distributes the Allen in a large territory surrounding Sioux Falls, S. D. He declares the bankers are unfair in many cases.

"Many of our customers are farmers," stated Bleeg at the Allen exhibit at the show, "and there should be good prospects for sales of cars to them. Crops have

been good and prices are high; prices, in fact, are higher than they would be under normal conditions.

"Before the farmer gets the money for his big crops he often is unable to buy a car because the banks will not accommodate him; if he wants to buy machinery or anything of that sort his paper is good, but if his paper is going into the hands of a motor car dealer the bank won't lend the money.

"The bankers claim they have to be conservative and that money is tight; I claim the banks are what has made money tight. If we could kill off about 150,000 bankers, I think the motor car business would be good."

#### WALPOLE TIRE SALE MARCH 10

Boston, Mass., Jan. 4—The Walpole Tire and Rubber Co. will be sold March 10. An attempt was made to fix an upset price at \$850,000, but this was defeated. The sale will be made without restrictions, except that no bid will be received unless accompanied by a certified check for \$50,000. The sale will be held at Walpole at 11:30 a. m. and the property will be sold as a whole.

The court has issued an order setting aside \$37.50 of the money now in the hands of the receivers for the payment of a 3 per cent dividend to all creditors whose claims had been allowed up to January 4.

## Burman Again Beats Barney Oldfield

### Peugeot Driver Smashes Dirt Track Record

BAKERSFIELD, Cal., Jan. 3—Special telegram—Barney Oldfield again met defeat at the hands of Bob Burman today, the American king duplicating the victory scored at Los Angeles last Sunday in the second of a series of 50-mile races held on the local 1-mile dirt track and incidentally establishing new A. A. A. records from 5 miles to 50 miles, inclusive.

The Fiat Cyclone, which went wrong at the start of last Sunday's race, was Oldfield's mount today, but it did not have the speed of the Peugeot that Burman drove. Bob lapped Barney at the completion of the thirtieth mile and the veteran quit in disgust, claiming that a valve had been broken.

Burman traveled the half-century in 40 minutes 58 seconds. The best time previously for this distance was 47 minutes 21 seconds, made by Louis Disbrow at San Jose. Burman did 5 miles in 4:02, 10 miles in 8:16, 15 miles in 12:23½, 20 in 16:25½ and 25 in 20:28½. Because electrical timing was not used, the 5-mile will not stand as a record, but the others will.

Motor racing has taken the place of boxing in California as the king of winter sports. The pugilistic sport was killed at the last state election and the last prize fight took place in the famous old Vernon

arena, a few days before the bill went into effect. The next day motor car racing was crowned the king of all California winter sports with the announcement of the Burman-Oldfield match race at Ascot park.

The public favors the motor sport and it is by far the greatest sport in the world. Boxing will not be missed in the state.

Following the Burman-Oldfield affair, the return match was announced for the Bakersfield track to take place New Year's day. Earl Cooper then was signed up to meet Oldfield in a match race at Fresno, a week after the San Diego exposition road race and the three stars, with the addition of either de Palma or Pullen, now are slated to meet in a 100-mile event on the Ascot park course in Los Angeles, the week after the Cooper-Oldfield go.

The Pacific Racing Association was incorporated to take the place of the Pacific Athletic Club which made and unmade fistie champions every week; and from the number of events lined up, the racing organization will become as popular as the fight promoting organization ever was within a few weeks. In addition to the match races, there are the San Francisco events and the Venice road race on March 17.

# Hunting Kangaroos by Motor Car One of Newest Sports

## Sensational Shoot Participated in by Australians



A SINGLE MORNING'S BAG OF KANGAROOS IN AUSTRALIA

**O**UT in the wild and unmanicured sections of Australia, where granite cliffs and scrubby brush form the prominent features of the landscape, a new form of real sport has been discovered—hunting kangaroos by motor car.

The mere chase alone is said to be productive of many thrills, calling for a fast car guided by an adept hand. To pilot a motor car through the open country, over fields dotted with rabbit warrens and bunch-grass bunkers, across gullies and through occasional patches of gnarled, stunted bushes at a speed of 40 or 45 miles an hour, calls for steady nerves, a cool head and consummate skill.

### Expert Driver is Needed

As the shooting is done over the side of the car, the man at the wheel is forced to maneuver his craft much after the fashion of a man-o'-war in order to give the rifles a chance. The hunters shoot from a bumping, swaying seat at a target which moves as fast if not faster than the car. The range varies from 50 to 100 yards. Truly the sport is one which makes some of Roosevelt's African junkets compare with a butterfly chase in a rose garden.

The fact that a prolonged drought had made the kangaroos a pest in the vicinity of watering places, caused the Willys-Overland distributor to offer his services and his cars towards ridding the country of numbers of the troublesome animals. Heretofore it had been found exceedingly difficult to bag the creatures without persistent and expert stalking.

Kangaroos are not easy to stop—let alone kill. They possess hearts like lions and unless hit in the head, spine or hind leg they will go all the faster for each shot. The only sign they give of a body shot is an extra long, swerving bound and an increase of pace until weakened by loss of blood. They will run 45 miles an hour

with injuries that would stop a human being in his tracks. A wounded 'roo can easily out-distance the fleetest horse.

A letter received with the pictures, by the Willys-Overland Co. in Toledo, contains an interesting description of the unique hunt. An early morning start was made from Adelaide in an Overland touring car and an Overland speedster, the objective point being the plains some 50 miles distant, where the kangaroos had made themselves especially obnoxious to the big ranchers. Each of the cars had a full complement of passengers, all of whom were armed with heavy government army rifles.

Twenty-five miles beyond Burra-Burra, the jumping-off place of civilization, was sighted a small mob of kangaroos, whose heads plainly showed over the salt bush to the left of the road. As soon as their sensitive ears caught the sound of the approaching cars the animals took to flight, but stopped at a distance of 300 yards long enough to allow a hunter to wound one of them with a ball from his carbine.

### Chasing a Wounded Kangaroo

While the others again started their swift flight the wounded 'roo took an opposite direction from its fellows and hopped away at a terrific speed. It is by use of its powerful tail that these animals are able to attain such wonderful speed. The speedster, turning into a course paralleling that of the kangaroo, followed for 3 miles in a straight line, bumping over the rough country at a speed never less than 45 miles per hour by the speedometer, without making a perceptible gain. Then the kangaroo with a single bound took a high wire fence marking the extreme boundary of one of the enormous Australian ranches, leaving its pursuers in a predicament that looked hopeless as far as the chase was concerned.

But a nearby gate was broken down and

the pursuit continued. Numerous bushes handicapped the car, but by putting the speedometer up to 45 again, on comparatively level ground, the car began to gain slightly on the tiring kangaroo. Gradually the driver turned from the parallel course and cut over towards the animal, which, seeing the change of direction, suddenly shifted its course to an angle which would take it directly across the path of the speeding car. The hunters discovered that this was inevitably the method taken by the fleet animals, instead of turning in an opposite direction from that of the car. This gave the hunters the chance they wanted to make their kill, which was accomplished without difficulty.

### Shooting Under Difficulties

Retracing their tracks the cars returned to the path and were going at a good speed again when suddenly five kangaroos jumped up from the bush several hundred yards ahead. Opening up wide the cars were well upon them before they gained full speed. But shooting from a car going 45 miles per hour over rough ground and at a bounding shadow, militates against good marksmanship.

However, within 400 yards, four of the five were dropped and the cars were after the fifth, a young one, which the hunters wanted to catch alive. The small animal left the road and took to the open country with the cars following in close pursuit. At 40 miles per hour one of the hunters crawled forward on the running board of the speedster and seized the kangaroo by the tail as the car caught up with it, and managed to cling to both the car and the trophy until the Overland came to a standstill.

In the course of the morning, thirty-four kangaroos and an Australian emu were bagged by the two cars. The action photographs were hard to obtain, being taken from the front seat of another car



which was following in the dust of the one in advance, with the camera set for one one-thousandth of a second.

The new sport promises to become popular with Australian hunters.

### OHIO WOULD CHANGE LAW

Columbus, O., Jan. 2—The legislative committee of the Ohio State Automobile Association is busy drafting bills to be submitted to the next session of the Ohio legislature, seeking to amend the present motor laws of the state. One of the principal amendments will be that of adopting the New York plan of regulating speed by doing away with the arbitrary limits of 8, 15 and 20 miles per hour and substituting a penalty for reckless and careless driving.

A bill also will be introduced providing that all vehicles shall carry lights at night which are visible from the front and rear. At present many cities have such ordinances but no state law of that character has been enacted.

Another bill, making a misdemeanor for any one to have in his possession or offer for sale a motor car with the manufacturers' number changed, removed or defaced, unless a true bill of sale is produced, has been prepared. A more rigid examination for chauffeurs will also be asked by the committee.

### CANADA'S MOTOR BATTERY NAMED

Ottawa, Ont., Dec. 31—Borden's armored battery is the name that has been given to the battery of armored cars which has been presented to the government by a number of prominent Montreal citizens, and which is under the command of Major Eddie Holland, V. C., of Ottawa. The battery is at present housed at the Peel street barracks at Montreal awaiting the completion of its equipment.

The type of car which is being used carries a turret in which the quick-firing gun is mounted. This turret can be swung in a complete circle so that the fire of the gun can be brought to bear on any point of the compass desired. The swinging of the turret is effected by the gunner

who, to turn himself, his turret and his gun, does not have to take his hand from the breech of his weapon, the movement being entirely effected with his feet.

There are many other novel and valuable features to the cars, among them being a triangular-shaped loop-hole at the front and rear for ride fire. This enables the marksman in the car to direct his fire to either side as well as to directly in front of him, the direction to which he is limited in the case of cars fitted with circular loop-holes. Several of the ideas for this car were gathered by Major Holland during his work with armored cars in the South African war.

### OKLAHOMA FIGHTS MOTOR TAX

Oklahoma City, Okla., Jan. 4—An attack on both the constitutionality and the statutory legality of the office of state highway commissioner is made by attor-

neys representing several car owners sued in the local courts here by the highway commissioner for collection of the \$1 state tax on car owners.

The allegation is made that the legislature, in passing its general appropriation act in 1913, made no appropriation for the highway department and in the same act is a provision which says that when no appropriation is made it is intended that the position involved shall not be filled in the biennial period covered by the appropriation act.

The attack is made upon the constitutionality of the office under that section of the state constitution which provides that no money shall be paid out of the state treasury except in pursuance of a specific appropriation—that the highway department, accordingly, has no right to act for the state in the collection and disbursement of the tax.

## Seeks to Minimize Dangers of Road Massachusetts No-Accident League Formed

BOSTON, Mass., Jan. 2—The Massachusetts No-Accident League has been formed at Boston, Mass., for the purpose of minimizing danger to people, among pedestrians. It is planned to investigate the cause of all accidents in which vehicles are concerned, and to attempt to prevent similar ones. Legislation will be sought to have lights placed at intersecting streets and roads in cities and towns and on the state highways; for the establishment of safety zones for people entering or leaving street cars, and for placing policemen at all crossings near schoolhouses that are frequently used by children.

The men back of the organization have been studying the figures of the motor and other accidents the past year. The motor deaths numbered 229, while 4,010 persons were injured. There was a total of 7,961 accidents in which motor cars figured. Of the fatal accidents 150 were pedestrians, fifty-six occupants of motor

cars, eighteen motorcycle riders, three bicycle riders and two were occupants of carriages. There was an increase of forty-one deaths over 1913. This was 21.8 per cent. The number of motor vehicles increased 23 per cent and the number of people authorized to drive them 22 per cent, so the ratio of fatalities kept pace with the increase. The number of injured showed an increase of 37.18 per cent, and the number of accidents increased 58.63 per cent. Of the injured, 2,308, or more than half, were pedestrians. Of the others, 879 were car occupants.

The officers of the new organization are prominent business men of Boston. Henry R. Loomis is president; Carrol L. Meins, vice-president, and George F. Hines, secretary-treasurer. Headquarters have been established at 153 Milk street. This makes the third such organization in Boston, the Safe Roads Association being the first, and the Highway Safety League the second.



IN CLOSE PURSUIT OF KANGAROO, WHICH CAN BE SEEN JUST IN FRONT OF CAR

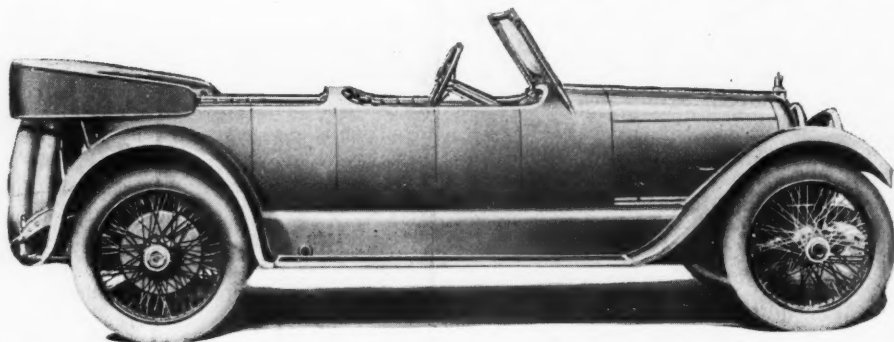


OVERLAND TRAVELS 45 MILES AN HOUR IN PURSUIT OF KANGAROO



# Makers Wait for the Show to Announce New Models

Mercer, Chalmers, Jackson, Detroit, National, Chevrolet and Dort Make  
1915 Debut in the Grand Central Palace



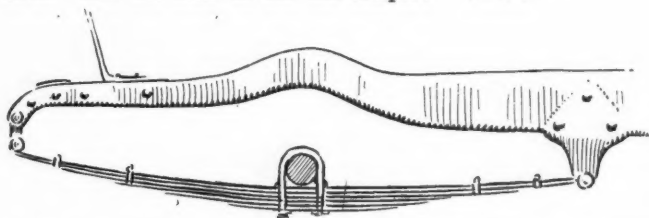
Newly-announced four-cylinder Mercer, model 22-70. The model shown is a four-passenger sporting type which makes its first appearance at the show

NEW YORK, Jan. 4—At the show there are several who showed either changes in body design to bring previous body models up to the latest dictates of fashion, or small mechanical changes without the revision necessary in the bringing out of an entirely new model.

The Paige company was unique in that it waited for show time to announce a reduction price on the model 36. This is the four which is continued from last season and which at that time sold for \$1,195. The reduction announced cuts this price to \$1,075.

## New Kisselkar at \$1,650

The Kissel 6-42 also had its price mark put on at the show. This is a new design with a 126-inch wheelbase, having a block cast L-head, 3.625 by 5.5 motor, cone clutch, three-speed gearset and 35 by 4.5 tires. This car sells in the one-compartment,



Long flat semi-elliptic springs used on the new Mercer chassis. Both front and rear springs are of this type

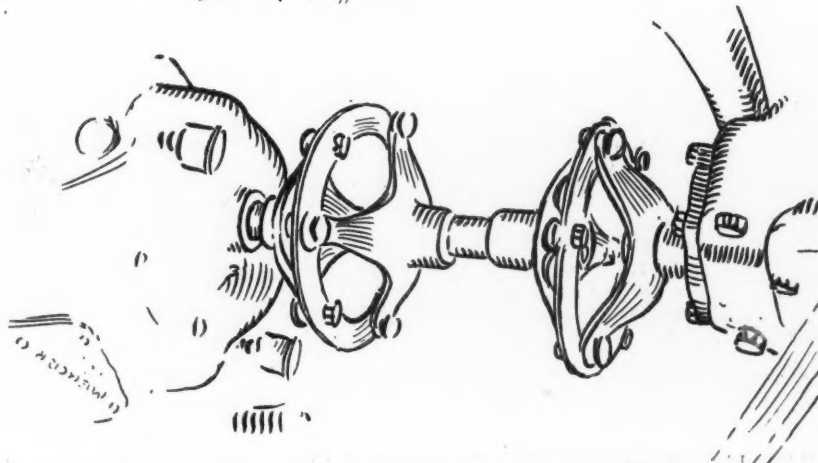
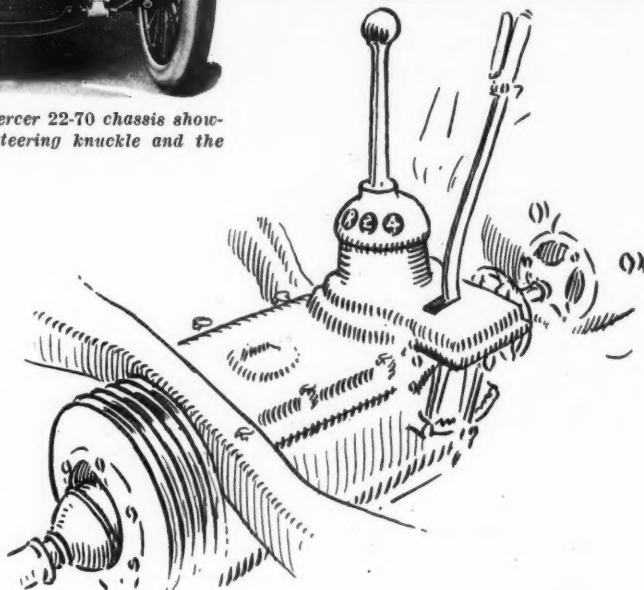
ment, two-door body style at \$1,650. With a detachable sedan top it sells for \$2,000. The purpose of this is to supply an all-year-round car which can be converted from an open to a closed design by simply adding the detachable sedan top which fits over the single compartment body. When used as a touring car it presents the appearance of an up-to-date divided front seat design and when used as a sedan only close inspection discloses the fact that the top is detachable.

New broughams are shown by Locomobile and Oakland. That shown by Locomobile is a special Brewster-built job for show purposes only. The Oakland's brougham is a new development which will



Front view of the Mercer 22-70 chassis showing the odd type of steering knuckle and the frame brace

The right illustration shows the gear-box and its brake on the new Mercer chassis



Steel ring universals used in the drive of the newly-announced Mercer

be kept as standard. It is characterized as an open front brougham and sells for \$2,500.

The Peerless company is showing a roadster which has something new in the way of roadster seating. The seats are arranged similar to those of a coupe, in which the driver sits slightly ahead of the other two passengers on the transverse seat. Back of the advanced seat of the driver is a compartment which can be used for packages and small baggage.

## Many Show Divided Front Seats

Several new concerns show bodies that have divided front seats as standard equipment on their five and seven-passenger touring cars. Among these are Kissel, Winton, Cole, National, Pathfinder, Premier and Westcott. The double cowl, which has heretofore been a characteristic of custom-made and imported bodies, are seen on such cars as Stearns, White, McFarlan and Lewis. The five-passenger job that the Stearns company is showing has only the suggestion of the double cowl,

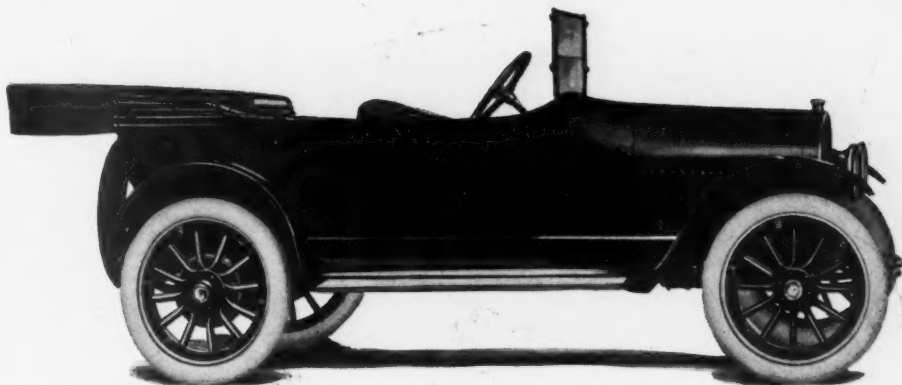
this being merely in the form of a moulded back on the front seats. The National company is only building the divided front seat style in five-passenger cars at the present time, but will build the continuous seat on order. No increase in price has been made in altering the body design.

The Moon company has revamped the body styles both in the seven-passenger touring and roadster. The seven-passenger touring has been refined in the tonneau by the use of disappearing spare seats as a substitute for the plain folding seats previously employed. The new roadster has a long rear deck with a small door in the side through which baggage can be placed in the compartment beneath the deck. There is a large opening in the deck at the rear extremity so that large articles or spare tires can be carried therein if desired. The car is regularly fitted, however, with tire irons to carry the tires in the rear.

#### Owen Car with Weidely Motor

The R. M. Owen magnetic transmission car is shown with the Weidely motor. This has been altered to some extent and differs in the method of driving the overhead shaft for the valves. The drive now is taken from the front end of the motor to the center on a straight shaft running horizontally within the crankcase in the same manner as a camshaft. From this point it is taken vertically upward by the spiral gears to the overhead camshaft, which it operates from the center, the shaft being in two lengths. The crankshaft has also been considerably stiffened to eliminate all possibility of vibrating within the range of practical motor speed.

Westcott shows a tendency to adopt the boat-line body, as it has three touring cars of this description on the floor at the Palace. The sheared line along the top of the body in connection with divided front seats gives the bodies a launch-like appearance.



New \$1,250 four-cylinder Jackson model 44. Its wheelbase is 115 inches and the motor a Northway of 4½ by 4¾

The Lewis company shows some bodies which have been produced by the Racine Body company that follow along foreign lines to a marked extent. These are copies of the Sunbeam bodies produced in England. A sedan which is in a deep canary yellow with red doors and trimmings excited considerable comment.

Mercer waited until the show to announce its new series of models. The new Mercers are entirely different from those of previous seasons, with the exception that the policy of building medium-weight,

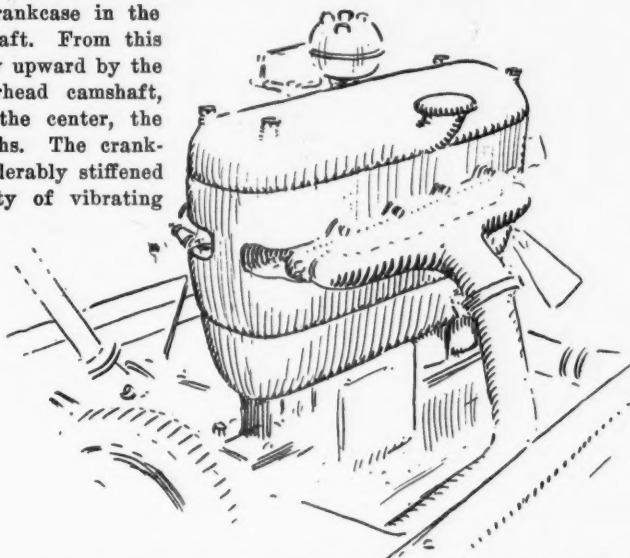
high-speed, four-cylinder cars is continued. The low line and high speed for which Mercer always has been noted are also features of the new model, for in the touring car the side line of the body is only 45 inches from the ground and the speed is guaranteed to be 1 mile in 45 seconds, or 80 miles an hour.

Four cars, a six-passenger touring, four-passenger sporting, both listed at \$3,000, a runabout at \$2,900, and a raceabout at \$2,750, make up the line. These are all mounted on the same chassis, with the exception that the wheelbase of the touring and sporting models is 130 inches, while the raceabout and runabout have 115 inches.

#### Details of the New Mercer

The new motor is of Chief Engineer Delling's design throughout, as, in fact, is the entire new chassis, none of the previous Mercer remaining. The power plant is a four-cylinder 3.75 by 6.75 L-head, block, with a piston displacement of 298.2 cubic inches. This gives an S. A. E. rating of 22 horsepower and the maker's rating is 70 horsepower at 1,800 r.p.m. The combination of these two horsepower ratings has given rise to the model name of the series which is known as 22-70.

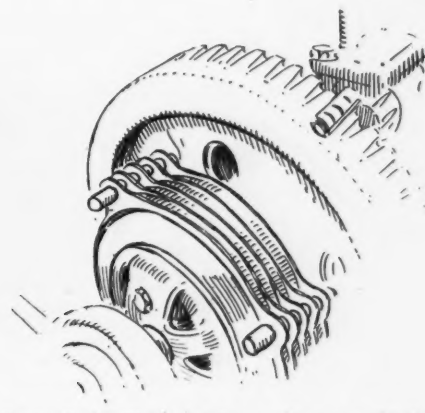
New Mercer features are in evidence throughout the chassis. The valves are on the right side and are inclosed by an aluminum cover plate held in place by two thumb-screws. In connection with the



Six-cylinder overhead-valve, block-cast motor used in the new Chalmers six. The dimensions are 3½ by 5

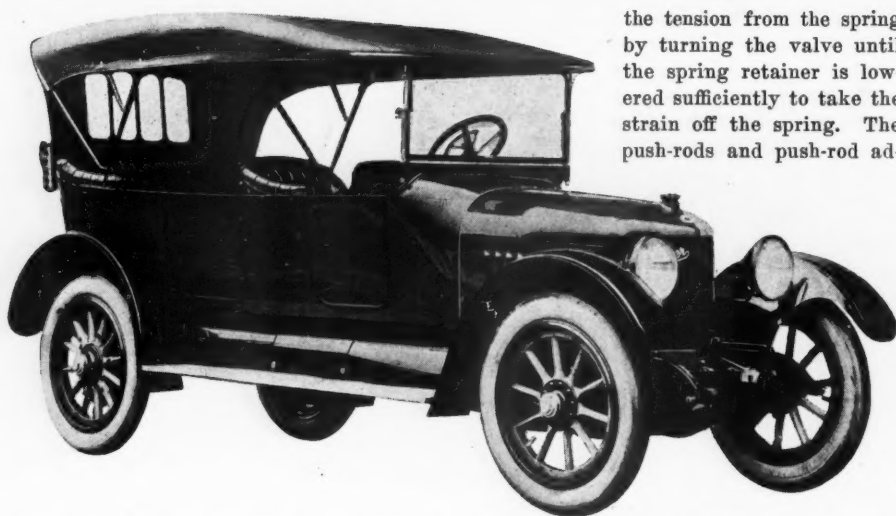


Latest Chalmers six, a new model shown at the show for the first time. Its list price is \$1,400 in touring form



Exposed dry-disk clutch on the new \$1,400 Chalmers six. The plates alternate Raybestos and steel





*New Premier model 6-50, which has individual front seats and foyer lights in the tonneau. It is being shown for the first time at the show, and lists at \$1,985*

block motor this cover plate gives an effect of simplicity to the exterior. This is heightened by the carbureter being attached directly to the cylinder casting, which carries the intake manifold integrally. The magneto and water pump are set at the front of the motor and are driven from a cross-shaft. This arrangement keeps the sides of the motor smooth and clean. A web is cast between the arms of the crankcase, extending out to the frame on each side of the motor, forming a shelf, which serves the purpose of a dirt seal.

#### Multiple Piston Rings Used

Multiple piston rings are used. There are only two grooves in the pistons, both of these being above the wrist pin, but in these two grooves there are six rings, three  $\frac{1}{8}$ -inch rings being used in each. The connecting rods are longer than usual, measuring 15 inches from center to center, thus reducing angularity to a large extent. In spite of the length the assembly is of lightweight, as the rod with four bolts weighs but 4 pounds, 1 ounce. The crankshaft is of 2.125 inches diameter and both the main and connecting-rod bearings are of bronze, lined with babbit.

The camshaft is driven by a 2-inch Coventry chain attached to the crankshaft and to a single camshaft gear. On the crankshaft sprocket is the worm gear which drives the magneto and water pump cross-shaft. Since the magneto is on one side and the water pump on the other, the balance drive is given on the cross-shaft.

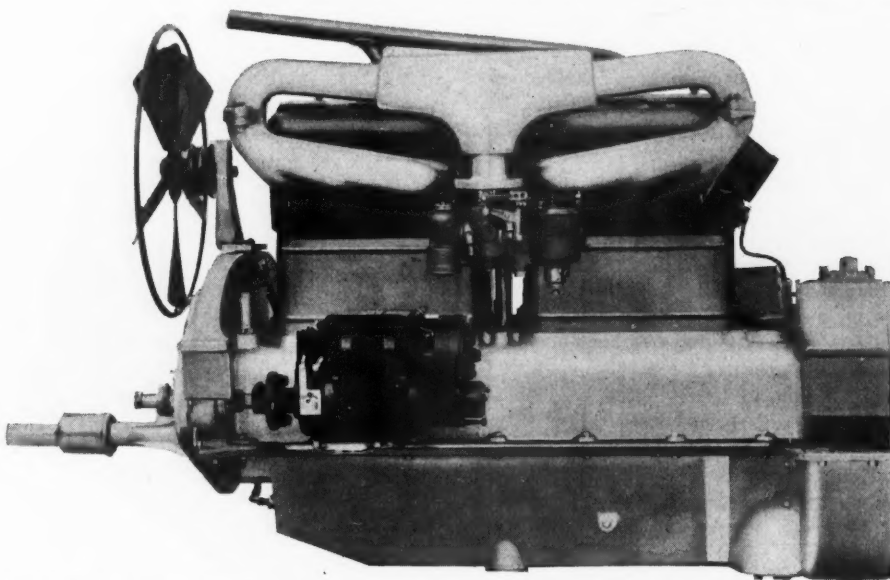
As would be expected from a motor designed for high speeds, the valves are exceptionally large, having a diameter of 2.25 inches. The valve stems are threaded at the end for carrying the spring retainers and the material is tungsten steel. By the use of the threaded valve stems the tension on the valve spring can be regulated by inserting a screwdriver in the slot on the head of the valve and turning to the required adjustment. If it is desired to change a valve spring or to remove a valve, it is possible to remove all

the tension from the spring by turning the valve until the spring retainer is lowered sufficiently to take the strain off the spring. The push-rods and push-rod ad-

tem. The oil is forced to all bearing surfaces under pressure varying from 10 to 20 pounds at slow speeds to 50 and 60 pounds at high speeds. The leads are all self-contained, there being no external oil pipes in any portion of the motor. The pump carries the oil directly to the camshaft and crankshaft bearings through leads drilled through the webbing in the crankcase casting.

#### Ignition and Cranker Equipment

Ignition is by single Bosch high-tension system and the balance of the electrical equipment is made by a U-S-L starting and lighting installation. This operates at 12 volts and while worked out to the special requirements of the Mercer car does not differ materially from the general U-S-L system. The apparatus consists of a motor-generator which takes the place of the flywheel. The storage battery is of 100-ampere-hour capacity. The clutch is



*Six-cylinder T-head motor of the new Premier 6-50. Note the odd-shaped inlet manifold. The bore and stroke are 4 by 5½*

justing screws are good examples of how care has been taken in manufacture to keep the weight as low as possible. These are hollow. The lower ends of the push-rods are fitted with rollers, which ride directly on the cams.

The camshaft is carried on five bearings. It is of hollow section and is carried in a continuous oil bath.

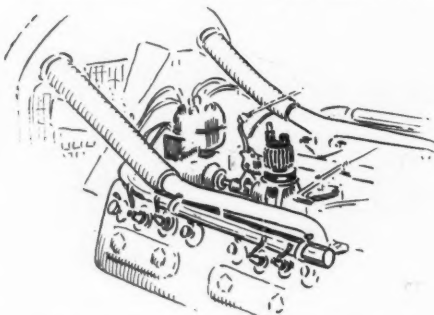
Lubrication is by a high-pressure sys-

tem. The oil is forced to all bearing surfaces under pressure varying from 10 to 20 pounds at slow speeds to 50 and 60 pounds at high speeds. The leads are all self-contained, there being no external oil pipes in any portion of the motor. The pump carries the oil directly to the camshaft and crankshaft bearings through leads drilled through the webbing in the crankcase casting.

The gearset provides four speeds and is provided with a distinctive locking device, which does not permit the gears to be shifted unless the clutch is disengaged.

The rear axle is floating. The springs are semi-elliptic all around, being 2.5 by 38 in front and on the touring and sporting models, 2.75 by 58 on the rear. On the runabout and the raceabout the rear springs are 2.5 by 52 inches. The rear springs are underslung and are located directly underneath the side rail. The drive is of the Hotchkiss type, both thrust and torque being taken through the rear springs.

A channel section frame is used with an arch over the rear axle. The front axle is an inverted Elliott design. The brake



*Eight-cylinder motor on the new King, showing the two water pipes and the ignition distributor mounted between the cylinder sets*

for service use is on the propeller shaft while the emergency brakes are on 16-inch drums attached to the rear wheels. Both the shaft and rear wheel brake are internal expanding. The wheels are wire on the sporting and raceabout tires and on the touring they are wood with Howard demountable rims. The wire wheels used are Rudge-Whitworth.

The cars are sold fully equipped, all models excepting the speedster design being fitted with a one-man top, Jiffy curtains, pump, jack, windshield, speedometer and a full set of tools. On the cars using wire wheels an extra wire wheel is supplied and on those using the wood wheels an extra demountable rim. The tire size is 34 by 4.5 on the cars using the 130-inch wheelbase and 32 by 4 on the cars using the 115-inch wheelbase.

#### Jackson Announces New Four

Another Jackson has made its appearance at the show. This is known as model 44 and is really a new edition of what was the Olympic model last year. The power plant is the same as that used in the former Olympic. This is a Northway unit having the clutch and gearbox housings integral with the crankcase. The rear construction and the chassis framework is really the same as the former Jacksons but there have been some changes in other details.

This model has a 115-inch wheelbase, 2 inches less than the Jackson of last season. Among the innovations for the Jackson company in this model is the use of a generator ignition system worked in conjunction with the autolite starting and lighting outfit. The underslinging of the rear springs is another feature new to Jackson practice. This gives the car a lower appearance which distinguishes it at once from the older cars.

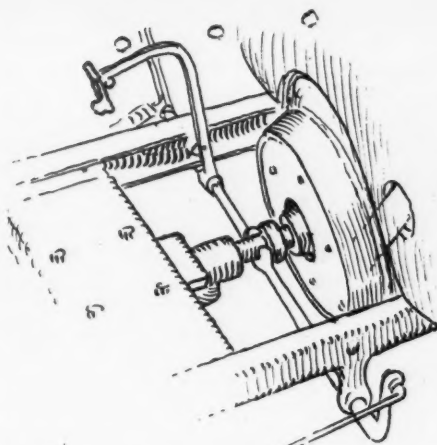
The body work of the new car also shows some departures from previous practice. The tendency towards streamlines is new, the use of crowned fenders and double bulb headlights with no side lamps are also Jackson departures.

The motor has L-head cylinders cast in pairs. The dimensions are 4.125 by 4.75. The gearbox furnished three speeds. The rear axle is a floating Salisbury bevel design geared 3.5 to 1. The tires are 34 by 4 and non skids are standard equipment in the rear.

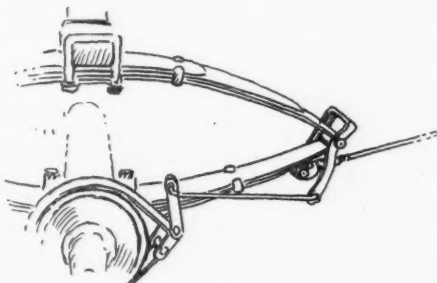
The car is sold fully equipped for \$1,250. It has a new type of one-man top, which is another feature making this car different from other Jacksons.

#### New Premier Six

In addition to the Weidely model the Premier company has announced a new model, seen for the first time at the New York show. This is a six with a 4 by 5.5, T-head motor with the cylinders cast in threes. The motor is of Premier manufacture and has a water jacketed intake and multiple exhaust. Carbureter is a Rayfield fed by the Stewart-Warner vacuum system.



Brake pedal and connection on the \$295 Argo on exhibition for the first time at the New York show



Argo rear brake connection hung on a spring end

Lubrication is by a combined pressure and splash system with the oil carried in the customary reservoir beneath the crankcase and fed by a gear pump to the main bearings from which it flows to the splash troughs. Cooling is by water circulated by a gear-driven centrifugal pump through a V shaped radiator. Ignition, lighting and starting is taken care of by a combination Remy outfit which operates at 6 volts. The headlights are double bulbs without side lamps. There is a combination tail and license lamp and lights for the instrument board.

The clutch is a disk with dry plates and the gearset provides three speeds. The drive is by shaft to a Timken floating rear axle with helical-bevel gears. While the wheelbase is the same for both the touring and roadster models, 132.5 inches the tires are 36 by 4.5 on the touring model and 35 by 5 on the roadster. The springs are semi-elliptic all around. Those in the rear being of exceptional length, 60 inches,

with shackled ends. Shock absorbers are provided as standard equipment.

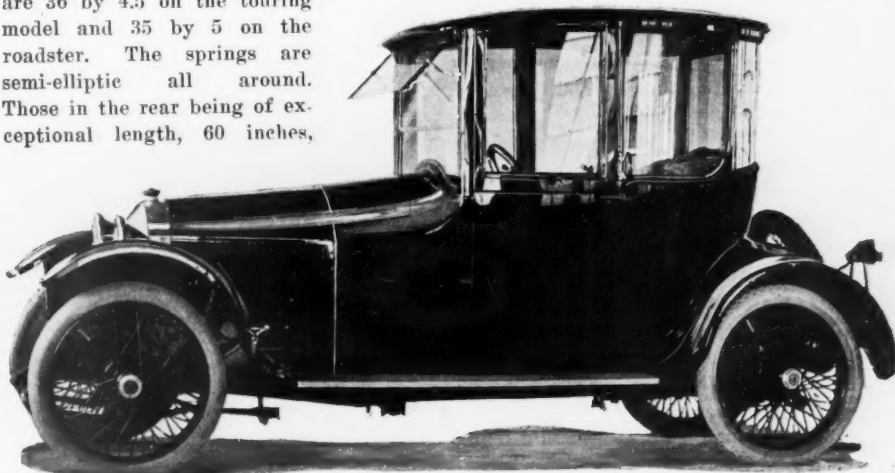
The equipment is complete at the purchase price, \$1,985, for both touring and roadster. In addition there is a coupelet for which the price has not as yet been set. The standard color is royal blue and equipment consists of a one-man top, Jiffy curtains, envelope, windshield, foot-rail, robe-rail, Warner speedometer, jack, Kellogg tire pump, trouble light, extra rim and full set of tools. There is a tire carrier on the rear for carrying one or two spare tires.

The body is a moulded design with a long cowl constructed of sheet metal panels over steel braced oak framework. The hood is a stamping and the fenders are flanged to give additional rigidity. Upholstery is in leather, tufted and lined with curled hair. The seats are divided in front. Wire wheels are sold at \$50 extra on the touring car and on the roadster they are optional equipment.

#### New \$1,400 Chalmers Six

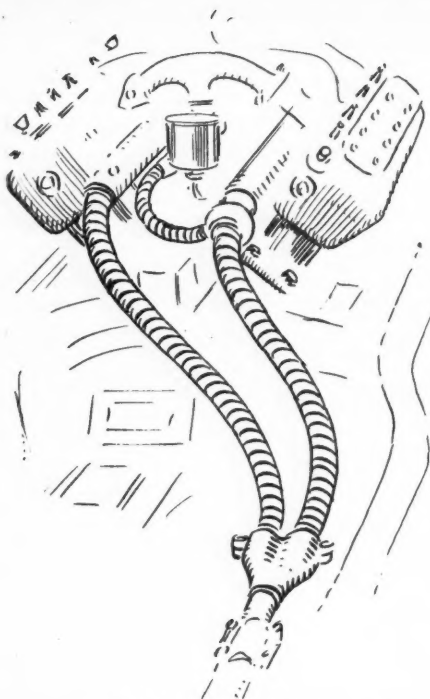
Seen for the first time at the New York show the Chalmers new six, with its overhead camshaft motor, is attracting more than passing attention. This car sells at \$1,400.

It is in the power plant that the most important features of this new car stand out. The 3.125 by 5-inch cylinders are cast in a single block with a unit removable head. While the valves are in the head, the drive is a new system for use in connection with this type of motor. A shaft which is a prototype of the ordinary camshaft runs transversely from the crankshaft to the right side of the cylinder block, where it connects through spiral gears with a shaft running vertically upward to drive the camshaft. None of this shafting can be seen on the exterior of the motor, but the vertical shaft is extended above the casing and on this is mounted the distributor for the Atwater Kent ignition system. The use of the overhead camshaft is designed to give a direct action on the valves and to overcome the objection of noise which is apt to develop in long rods and linkage.



Three-passenger Scripps-Booth coupe which makes its debut at the show





Double exhaust system of the new Detroit eight showing two flexible shafts, one from each cylinder block leading to the muffler

The camshaft is driven by steel and bronze gears and carries the cams integral. The inlet valves are nickel steel and the exhaust valves tungsten steel. They all are inclosed and oiled from a hollow camshaft.

The carburetor is a Rayfield hot-water jacketed and with the intake air heated by contact with the exhaust manifold. There is a gasoline adjustment on the dash which controls the supply through the nozzle. A special intake manifold priming device also is on the dash.

The drive is taken by a dry-plate disk clutch, which has alternate Raybestos and steel plates. The gearset provides three speeds and the drive is through an inclosed shaft with a torsion tube bolted to the housing of the gearset. The axle is floating with a pressed steel housing. The rear wheels are carried on Hyatt high-duty roller bearings and the differential on Timken taper rollers. The brakes are on the rear wheel hubs with the service set contracting; 14.375 inches in diameter and 2.25 face width. The emergency brakes are expanding and have a diameter of 14 inches and a face width of 2 inches.

The bodies are sheet metal over a wood frame and are made in five-passenger touring style only. They are on a 120-inch wheelbase and have 34 by 4 tires. The equipment includes a Gray & Davis two-unit starting and lighting system.

#### Detroit Shows Its Eight-Cylinder

The Detroit eight, while announced shortly before the show, makes its first appearance. This car is equipped with an eight-cylinder motor with the cylinders cast in fours and arranged in a V in accordance with the general scheme adopted by the users of the eight motor.

Other than the new motor the car does not vary to any great degree from the previous Detroit. In fitting the new motor the wheelbase has not been altered and the entire remaining specifications of the car remain practically the same. The tires, however, are slightly larger, being 33 by 4 instead of 32 by 3.5.

The new eight motor is a 2.75 by 4.5 with the valves on the left for the left block of four cylinders and on the right for the right cylinders. The two blocks of four cylinders bolt to a common crankcase and have their center lines at an angle of 90 degrees to one another. With this arrangement a single crankshaft is used which is similar in design to that of a four-cylinder crankshaft. The connecting rods of opposite cylinders attach to the same bearing, one having a yoke end and the other a rod going between the arms of the yoke.

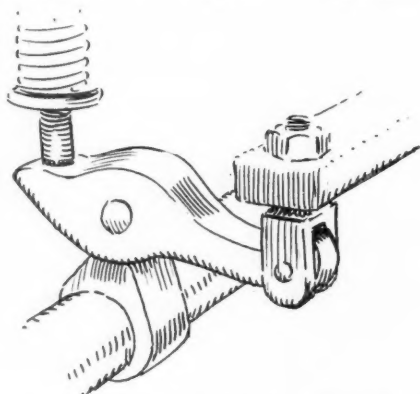
Only one camshaft is required and the cams for each set of cylinders operate the valves of the opposite cylinder also.

The carburetor is a Rayfield, one instrument being sufficient for the entire eight cylinders. This is mounted between the two blocks of four cylinders and so arranged with the intake manifold that an equal distribution of gases will be fed to both sides of the V. Ignition is by the Atwater-Kent system and starting and lighting by the Remy two-unit device.

In revamping the chassis light weight has been sought in the use of drop forgings in place of castings. The gasoline tank is now under the cowl and while this was used in the four-cylinder models of this season it is still a 1915 departure for the Detroit company.

The clutch is a cone and the gearset provides three speeds. Both these units are new as the clutch was a disk in the four-cylinder model. Both the clutch and gearbox are products of the Massnick-Phipps concern. Steering is on the left and is accomplished by a Gemmer gear. Control is in the center. Both the front and rear axles are of Weston-Mott manufacture.

So far the only body supplied is a touring but both that and a roadster are marketed as regular stock at \$1,295. Equipment is complete as generally



No tappets are used on the new Paige six, the valve being controlled by means of small rockers pivoted in carriers, as shown above

offered, consisting of a one-man top, speedometer, windshield, pump, jack and a full set of tools. The tires are Goodrich and are non-skid in the rear.

#### Remington Eight a Surprise

One of the eight-cylinder surprises at the New York show is the Remington, fitted with a Perkins V motor in two blocks of four and selling in touring and roadster forms at \$1,495 on a 116-inch wheelbase. This car has joined the pioneers in the eight-cylinder field.

As is customary in the eights, the cylinders are L-head with the valves on the right side of the right block and the left side of the left block. A single crankshaft is used and the two blocks of four cylinders bolt to the common crankcase. The cylinder dimensions of the Remington eight are 3.125 by 4.5. The connecting rods are the fork and yoke design providing for a crankshaft which does not differ from that of a four-cylinder motor. The valves are operated off a common camshaft and a single carburetor provides for all eight cylinders through a symmetrically designed intake which is arranged to feed both sides of the V and to provide equal distribution of the gas.

Ignition is by a battery system and lighting and starting by Gray & Davis. The clutch is a disk and the gearbox provides three speeds. The drive is taken through a shaft and bevel floating axle of Salisbury manufacture. The wheels are wire and the tires 34 by 4 inches. Control is in the center and left or right drive is optional.

#### Malcolm Makes Debut

The Malcolm, a product of the Malcolm Motor Co., of Detroit, and made only in roadster form, is one of the new models to be first seen at the show. This is a light car job throughout, having an L-head block-cast motor of 2.875 by 4, with a two-bearing crankshaft. The crankshaft is exceptionally large, having a diameter of 2.5 inches. The motor is designed for lightness and hence shows very little in the way of exterior fittings. The clean appearance is heightened by the use of thermo-syphon cooling, which eliminates the water pump, and by inclosed valve actions with thumb screws to hold the cover plates in position.

Ignition is by the Atwater-Kent battery system and the carburetor is a Zenith. The price of \$425 is exclusive of the electric lighting and starting system, but when this is fitted at \$70 it is an Allis-Chalmers. The clutch is a cone, and the gearset a three-speed selective. The wheelbase is 100 inches and the tires 28 by 3.

#### Improvements in National

While apparently the National six exhibited at the show is that announced several months ago, it is yet a new model, both in name and for the reason that several improvements have been made. It is known as the A B. The principal change is in the adoption of the spiral-bevel drive.

Other changes include a lengthening of the wheelbase from 132 to 134 inches. The mounting of the starting system to the fly-wheel instead of using the double-deck machine with connection to the timing gears by silent chain and the addition of Hartford shock absorbers as standard equipment. The five-passenger body has been revamped and now has divided front seats and is longer in the tonneau, due to the 2 inches increase in the wheelbase.

Mechanically the cars are otherwise unchanged except as is necessitated by the slight alterations enumerated above. The Eisemann magneto still is used as a source of ignition current, but the Westinghouse outfit is divided into two units, which are not in any way connected, whereas the double-deck construction was used formerly. As compared to the six of a year ago the crankcase is heavier and more rigid and in the springs silico-manganese replaces carbon steel.

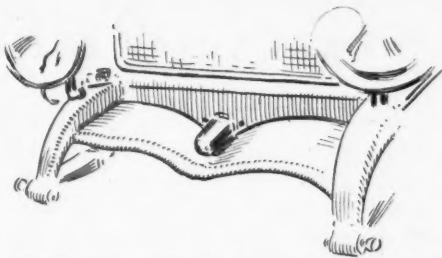
The power plant is a 3.75 by 5.5 L-head block with waterjacketed intake and with inclosed valve mechanism. The carbureter is a Rayfield and the gasoline feed by pressure.

The feature of the body work exhibit of the National company is the four-passenger parlor car, which has individual seats mounted on tracks, so that they can be placed about the body as desired. If required, they can be lifted from the body individually. In the rear of the body there is a folding seat which holds an additional passenger. In the touring body the car sells for \$2,375.

#### Lexington Adopts T-Head Motor

The new Lexington four is changed in several respects from the four of last season, having gone to the longer stroke type, and being one of the few examples of where a concern has shifted from the I-head type of motor to the T-head. The motor is now a Teetor 3.875 by 5.25 with its four cylinders cast in block. Another point in which a change has been made is in the spring suspension, which is now by cantilevers instead of three-quarter elliptics. Starting, lighting and ignition is by the Westinghouse combination system and the wheelbase is 115 inches.

The use of vacuum feed on this model has enabled the designers to secure a more accessible arrangement of the carbureter and to shift the gasoline tank from under the front seat to the rear of the chassis. Another change in the car in the way of equipment is the fitting of a power tire pump.



Curved mud apron on front of 1915 Overland

The drive is taken through a disk clutch and three-speed gearset and transmitted to a bevel-type floating axle, made by the Hess company.

Considerable improvement in body work and in upholstery are noticeable in the new four. The touring car which lists at \$1,375 is of streamline tendencies. It has a slightly sloping hood and a moulded line at the cowl, which eliminates any sharp edges along the length of the body. The roadster sells for \$40 less, listing at \$1,335, and at the purchase price both cars include the electric cranking, lighting and ignition. The standard color is a blue black for both the touring and roadster models.

#### New Chevrolet at \$490

A new car at \$490 is the offering of the Chevrolet Co., on exhibition for the first time at the show. This car, while smaller than any put out by the Chevrolet company in the previous season, follows very closely along the lines of the other Chevrolet cars. It has a Mason valve-in-head motor with a detachable cover-plate concealing the overhead valve action and at the same time helping to silence the motor. The detachable head is light and can be lifted off readily when it is necessary to inspect the valve mechanism.

The dimensions of the new four, which is a block design, are  $3\frac{7}{8}$  by  $4\frac{1}{8}$ . The cylinder head is a one-piece casting secured to the cylinder block by bolts, making a readily removable assembly. Lubrication is by circulating splash and ignition by a single Simms system with hand control. The carbureter is a Zenith and the starting and lighting system an Auto-Lite 6-volt installation.

A cone clutch delivers the power to a three-speed selective gearset located amidships. Final drive is by bevel gear to a semi-floating rear axle. The tire size is 30 by 3 inches all around and the wheelbase 102 inches. The wheels are wood and the car has left drive with center control.

The body supplied with the new model is a five-passenger touring and it is fully equipped with top, windshield, speedome-

ter, jack, pump and a set of tools. The purchase price includes the lighting and starting system and a full set of electric lamps.

#### Dort, a Newcomer

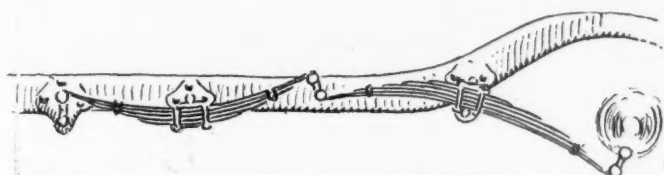
The Dort car, manufactured by the Dort Motor Car Co., a new concern which has recently incorporated for \$500,000 under the laws of Michigan, and which consists largely of the stockholders of the Durant Dort Carriage Co., makes its appearance.

While practically on one chassis, as far as general design is concerned, the touring and roadster models which make up the line are carried on different wheelbases, have different size motors and different tires. The touring model, which sells for \$680 without starting, has a 105-inch wheelbase, 30 by 3.5 tires and a 3.25 by 5 powerplant. The roadster, selling for \$495 without equipment, has a 92-inch wheelbase, 30 by 3-inch tires and 3 by 4 motor.

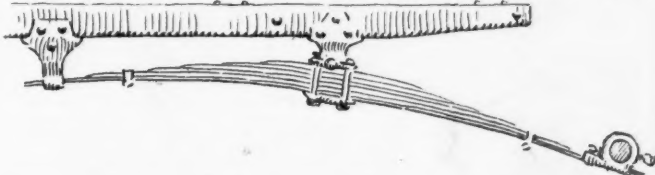
Both chassis have the same characteristics in other particulars. The motors are block cast, having four 1-head cylinders. The motor itself is a product of the Dort company, which is allied closely to the Chevrolet and other Flint industries. It is designed for light high speed work with a two-bearing crankshaft and has the distinctive feature of a large diameter for this unit. The crankshaft has a diameter of 1.75 inch and is carried on exceptionally long bearings, the front measuring  $3\frac{1}{8}$  inches and the rear  $4\frac{1}{8}$  inches. Another distinctive feature of the motor is the twin ejector type of exhaust. With this manifold cylinders 1 and 4 exhaust in one passage and 3 and 2 in another, thus avoiding any chance of dead gases entering the wrong cylinder and at the same time helping to create a vacuum into which it is easy for the motor to exhaust at low pressure.

Ignition is by the Connecticut battery system and the carbureter is a Marvel model H. The lighting and starting system, which, when electric, sells for an additional \$45, is the Appleco. When this is not supplied an acetylene generator and full set of lamps takes its place.

The clutch is a leather-faced cone and the gearbox provides three speeds with a selective arrangement. A feature of the car is that the entire drive from the clutch to the rear wheels is taken through 3.5 percent nickel steel as the gears in the gearbox, the 1-inch propeller shaft and the bevel-gear rear axle with its 1.25-inch shafts are all of this material. The spring suspension is a floating cantilever with the drive taken through the torque tube.



Double rear spring suspension on the new Twombly. Here a combination of semi-elliptic and cantilever is employed



Unusually long cantilever springs are used on the new Dort car, which makes its first appearance at the show



# Reo Company Reports Net Profits of 2½ Millions

## Another Large Dividend Promised This Month

LANSING, Mich., Jan. 2—During the fiscal year ending October 31, 1914, the Reo Motor Car Co. made a net profit of \$2,539,187.34. As a result it is stated that some time in January the shareholders will be given another large extra dividend by a vote of the directors.

In this connection it might be stated that during the 10 years of its organization the Reo company has paid dividends totaling 1,527, 4-10 of its original capitalization, which was \$500,000.

During the present year there were built and shipped 13,516 passenger cars, having a total value of \$16,332,000, which brings the total number of cars made by the company since it started in business to about 70,000, having a total value of \$75,000,000.

With the increase of its capital stock from \$2,000,000 to \$3,000,000, arrangements have been made to greatly increase the production facilities of the plant and beginning February 1, a schedule of 100 cars a day will be maintained. This week more than 2,300 men were on the payroll and this force probably will be increased shortly.

In 1914 the Reo company purchased supplies from manufacturers and merchants located in Lansing and vicinity to the amount of \$1,600,000, which naturally helped the general business and the welfare of the people of the city.

The total amount of wages paid during the year was \$1,654,577, which is one of the largest total payroll accounts of the year among motor car manufacturers in the United States.

At the last meeting of the stockholders of the Reo company it was decided to change the end of the fiscal year from August 31 to October 31; thus the annual statements for 1914 cover a period of 14 months instead of 12.

The total assets amount to \$5,090,158.87 as compared with \$4,217,474.20 in 1913 and

\$3,604,784.05 in 1912. The total liabilities which balance with the assets consist of \$3,000,000 capital stock or an increase of \$1,000,000 over the 1913 and 1912 statements. The surplus at the end of the fiscal year was \$1,692,082.07, while in 1913 it totaled \$2,061,768.23 and \$1,296,962.59 in 1912. The accounts payable total \$337,578.35 instead of \$126,972 in 1913 and \$280,882.51 in 1912.

### MAXWELL'S GIANT CATALOG

The Maxwell Motor Sales Co., Newcastle, Ind., which is the service organization of the Maxwell Motor Co., Detroit, Mich., has issued what is said to be the biggest parts price list ever compiled by a motor car manufacturing concern.

This price list which has been prepared for the special needs of the dealers is brought out in the shape of a book of 416 pages, the title of which is, "Dealer's Master Parts Price List." It refers to six different cars—the Columbia, Brush, Everitt, Stoddard-Dayton, Courier and Maxwell-Briscoe—of which there are 164 different models and more than 100,000 cars in use in the United States and in foreign countries. None of these makes of cars is produced at the present time but it is necessary to keep parts in order that the large number of motorists owning them may make replacements.

These facts give an idea of the magnitude of the book in which 60,000 different parts are mentioned. In addition to the price of each item, there is given the serial or stock number, sometimes the factory number, the code word and the number of parts needed for a car. It required 8 tons of paper to produce the list and fully 5 tons of metal type, the expense for this metal alone being over \$2,000. The book was issued from the printers a little over 6 months after the work of compiling the data or information was started.

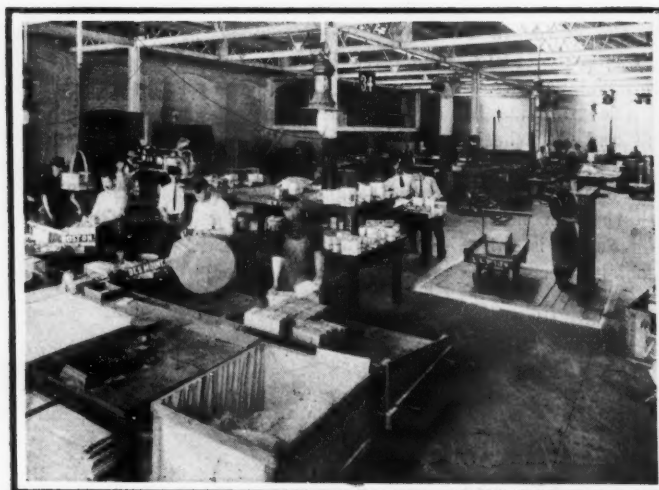
In order to make this book of reference easier to handle and very comprehensive it has been divided into six sections, each one referring to one of the six cars concerned. Each section is printed on paper of a different color. Thus, for instance, section 2, which refers to the various Columbia models, is printed on buff stock, while section 5, which refers to the forty different models of Maxwell-Briscoe cars, is printed on white paper.

General instructions to the dealers are given showing them how to forward the parts to the Maxwell plant. Any dealer or garageman may secure the book by asking for it.

It was for the purpose of providing better service for its many customers that the entire plant of the Maxwell company in Newcastle was turned into a service house. The plant is a three-story structure, 722 by 60 feet, with a working force of several hundred.

From 600 to 800 orders are received daily and with few exceptions these orders are filled or shipped within 24 hours. If an order cannot be filled within 48 hours from the time of its reception, the customer is advised by special delivery letter. The 24-hour service is made possible from the fact that a stock of nearly 35,000 different kinds of parts is kept on hand, the value of which is about \$2,000,000, and is entirely independent from the stock of parts kept in the Maxwell warehouse in San Francisco, Cal., and which is worth over \$250,000.

During the fiscal year from August 1, 1913, to August 1, 1914, a trifle over 246,000 individual parts orders were received. The total weight of the parts ordered was 8,610,000 pounds or 4,305 tons, divided as follows: 3,000 tons or 6,000,000 pounds shipped by freight; 1,250 tons or 2,500,000 pounds sent by express, and 55 tons or 110,000 pounds sent by parcel post.



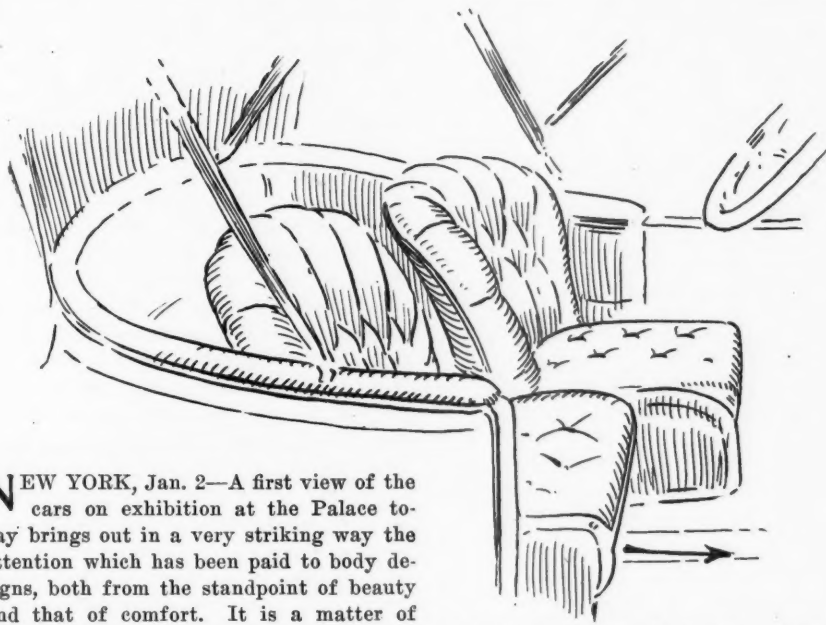
SCENE IN SHIPPING ROOM AT MAXWELL'S NEWCASTLE PLANT



FENDERS OF ALL SHAPES AND SIZES IN MAXWELL'S PLANT

# Body Styles at the Palace Tell Tale of Advancement

Unusual Degree of Refinement Noted in Big Show—Boat-Body Types Prominent—Corridor Body Has Passage Between Front Seats—Other Points of Interest



Interior view of the Lexington roadster showing the adjustable seats. These are arranged so that either or both may be moved forward to the most comfortable position

NEW YORK, Jan. 2—A first view of the cars on exhibition at the Palace today brings out in a very striking way the attention which has been paid to body designs, both from the standpoint of beauty and that of comfort. It is a matter of some significance that there are fewer exhibitors this year who are laying stress upon the mechanical features of their cars to the exclusion of the superstructure. This may be taken to mean that the public has reached the point where it has sufficient confidence in the mechanical details of those cars in which there is no departure from conventional in the chassis and is content to leave that part of the car to the manufacturer.

This fact has been partially responsible for an unusual degree of refinement in the body lines and coach work, as most attention of the visitors seems to be directed to these points. This development has progressed in a number of directions.

## Boat Bodies a Development

Chief among the developments is the new type which is called the boat body and this type of body bids fair to have as much of a vogue as has the so-called streamline body, of which it is an off-spring. The boat body, it may be explained, is a body design in which the marine idea is made paramount by giving the upper line of the sides a downward curve at their center and making the sides slightly higher at both front and rear. At the same time the sides have been flared out in a rounded, smooth curve and the upper edge carried high enough so that there is little or no upholstery above the level of the sides. These three features give a design very suggestive of a natty launch and the effect is heightened by the practice of carrying the bodies lower this year, and to a still greater extent by the rapidly increasing use of chair seats.

In the roll of those cars in which are shown boat bodies, or modifications of the

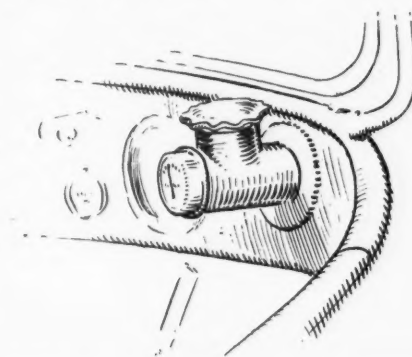
boat body, may be mentioned Cole, National, Oakland, King, Haynes, Marmon, and others. A most recent and most welcome change in bodies is the chair-seated vehicle, in which portable or reversible chairs take the place of the conventional seats, and which can be arranged to suit the passengers, or in some instances taken out of the car altogether for cleaning. The most prominent exponent of this type is the National, which has dubbed its chair-body the Salon touring car.

## Corridor Body Is New

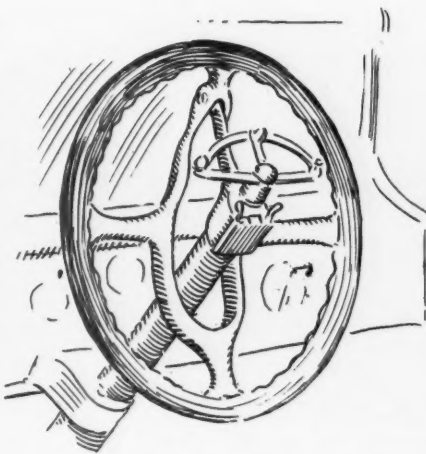
Closely related to this type is the corridor body, in which there is a passage-way between the two front seats, permitting interchange of positions between the front and rear seats without leaving the car. Among the cars which have these divided or bifurcated front seats are the Lexington, Davis, Pathfinder, Westcott, Premier, Crawford, Winton, Peerless, National, Cole, Kisselkar and Oldsmobile. In the Kisselkar and National the idea has been carried even further and both front and rear seats are divided.

Increase in comfort seems to have been the main object in nearly every one of the cars on exhibition. One way in which this is accomplished is by the use of adjustable seats, so that the height of the seat or its position longitudinally can be altered to suit the needs of the individual passengers. With this arrangement the owner is given all the advantages of built-to-order body so far as seat location is concerned.

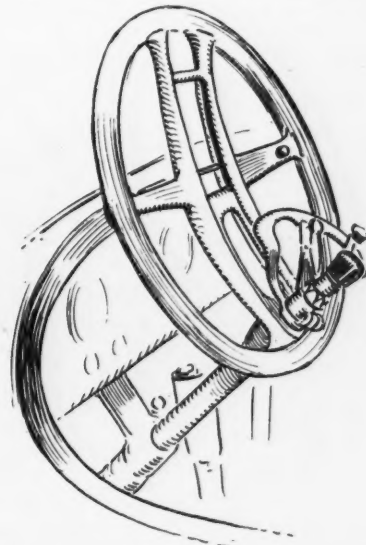
Maxwell accomplishes this in a very neat way, and a similar idea is used on the Lexington roadster. In the latter there



Combination filler neck and gasoline gauge on the cowl board of the new Saxon six-cylinder model

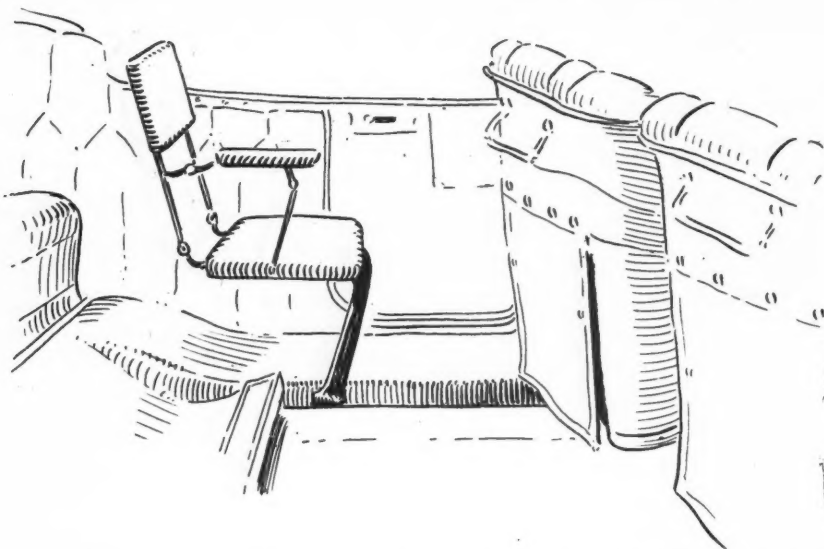


Steering wheel of the Cadillac eight as it appears when dropped to give greater clearance when the driver enters his seat

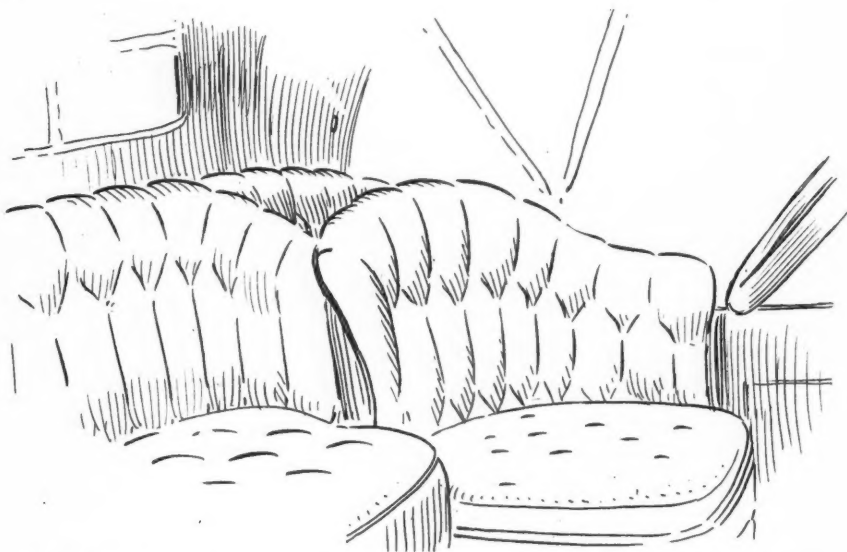


Adjustable steering wheel on the eight-cylinder King. It is shown slipped up on the column, thus giving about 5 inches more room for the driver in entering and leaving his seat

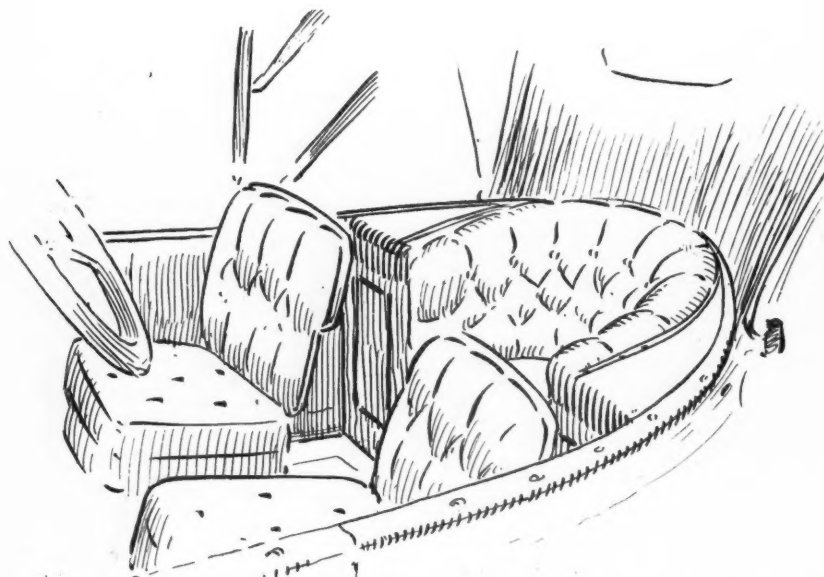




*Disappearing extra tonneau seat in the National touring car. This seat folds into the back of the front seat and then may be covered completely by the apron shown in the illustration*



*Seating arrangement in Peerless touring car showing the seats set in staggered fashion*



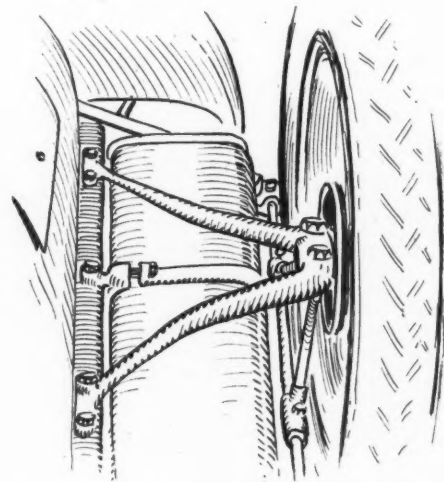
*In the Briscoe three-passenger roadster two persons sit on individual chairs and the third behind them in a seat which is part of the body. This construction does not call for an extra wide body*

is left space behind the back of the seat when the seat is brought forward, so that considerable small luggage may be carried out of the way.

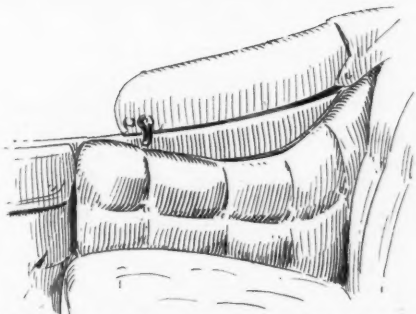
Another recent idea in comfort is the use of steering wheels, which may be thrown up out of the way temporarily when the driver is entering or leaving his seat, and this permits the steering wheel to be placed close in to the operator's body, where the best driving position may be obtained, and yet prevents interfering with entrance or egress to the seat. One type of this is used on the King eight. In this the web is in the form of parallel rails which slide on the steering column head, and the entire wheel is thus pushed up out of the way, giving about 5 inches more clearance than normally. In the Cadillac eight, the steering wheel folds back, the lower half dropping down out of the way, and thus adding 5 or 6 inches to clearance between seat and wheel.

#### More Luggage Space in Cars

There has been considerably more pains taken this year in the arrangements for disposing of robes, clothing and touring impedimenta of passengers. Perhaps the finest example of progress in this line is in the White and Winton touring cars, in which there are provided miniature clothes presses in the back of the front seat. In the White, for instance, the double cowl effect in its new body is utilized to increase the space between the back of the front seat proper and the paneling with which it is finished and thus there is a space about 6 inches deep, the entire width of the car, and the height of the seats, in which luggage may be stored. This is finished with oak doors, which can be locked, and thus provide protection from dust and rain, as well as sneak thieves. The McFarlan has a similar cowl back of the front seats and utilizes the space in a way similar to that of the White, except that instead of having it completely inclosed, the space is more in the form of a covered pocket.



*View across the extreme rear of the Haynes roadster showing the spare tire carrier with a tire in position. The carrier arms are shown attached to the rear of the frame at one end and to the carrier hub at the other. The fuel tank holding band also is shown*



*Unique arm rest in tonneau of White touring cars. The upholstery is about 5 or 6 inches below the body edge. Note also how the cushion is curved to provide a comfortable arm rest*

The new design of the White body is the result of extending the streamline idea to portions of the car other than that of simply the hood and fenders. In evolving a design in which the streamlining was carried out logically throughout the car, without losing anything in the way of comfort and roominess of the seven-passenger creation, the designer of the White has developed a body in which the lines are very suggestive of European practice. There is a flaring hood which leads into a heavy cowl with a backward curve which directs the eye to the seat line. There is a central cowl back of the front seat which aids in carrying out the streamline design and also offers a protection for the robes, etc., which may be carried there. The bodies are widest at this cowl, that is, in the rear of the front seats. A similar idea is found in a few other cars, McFarlan having this double-cowl effect.

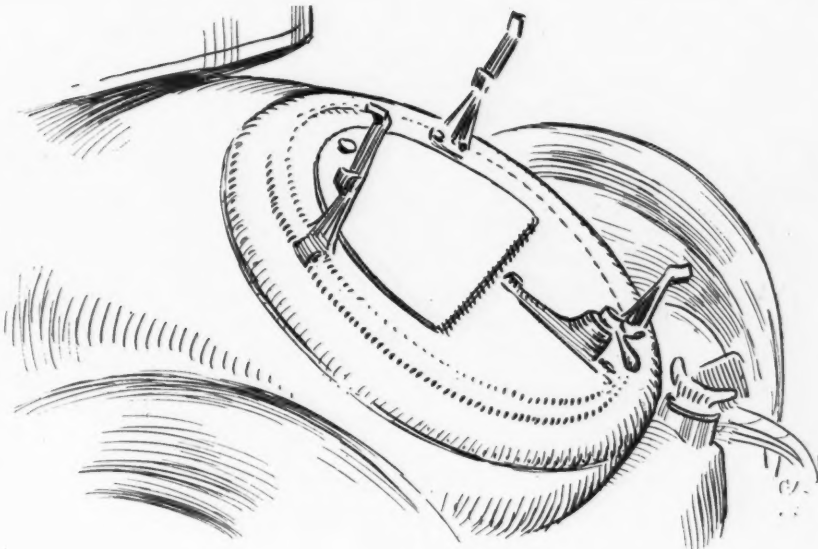
The White also has developed a novelty in the way of an arm rest for the tonneau passengers. In this the upholstery at the side of the seat, instead of being carried up to the top of the side in the ordinary way, is left some 3 or 4 inches below the top, so that the padded portion forms a rest for the arm.

#### **Extra Seats More Comfortable**

In the matter of extra seats there has been considerable accomplished toward making them less in the way when they are not wanted, and more comfortable when they are wanted. Probably the best example of this is in one of the National bodies in which the spare seats fold completely out of sight into the back of the front seat, which then closes over them. In another National body, the salon touring body, a fifth seat in the center of the rear of the tonneau is arranged to be completely concealed, folding back into the rear panel of the body.

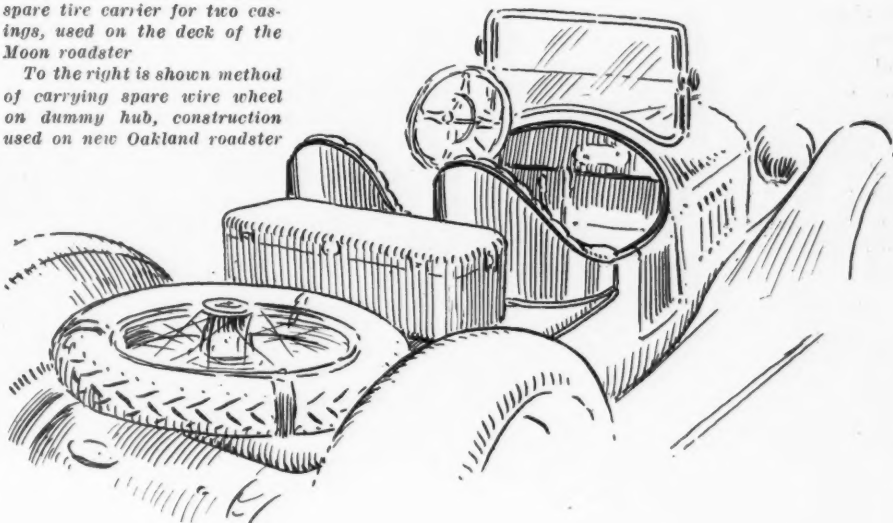
In the spare seats on roadsters, such as monkey seats, and mother-in-law seats, which are often considered a necessity for carrying an unexpected passenger, there has been some effort toward making them less conspicuous. The Packard roadster carries a disappearing seat in its rear deck. This is not new but is typical of the arrangements that are employed.

What is probably the most freakish of

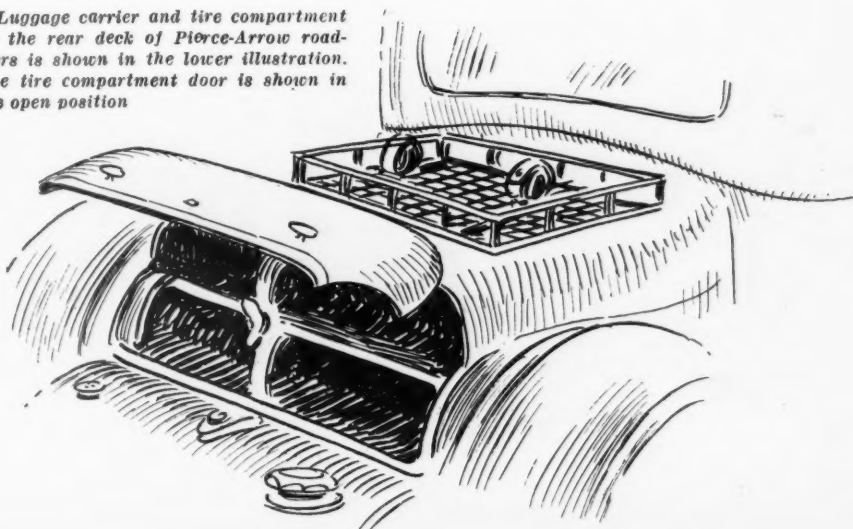


*Upper illustration shows the spare tire carrier for two casings, used on the deck of the Moon roadster*

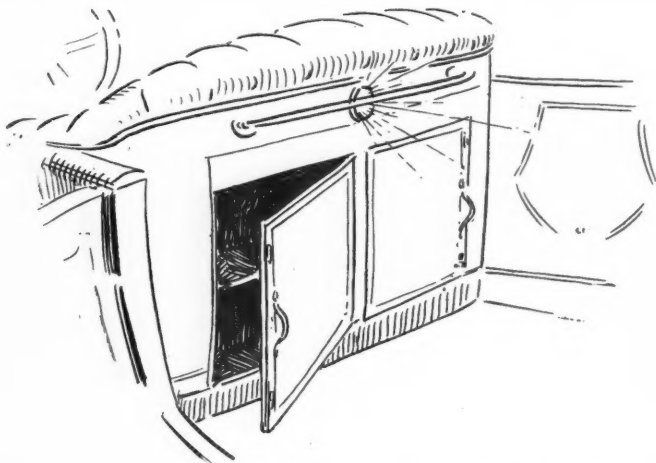
*To the right is shown method of carrying spare wire wheel on dummy hub, construction used on new Oakland roadster*



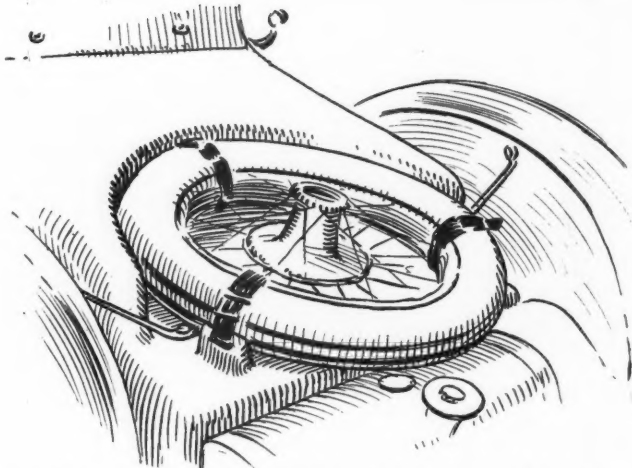
*Luggage carrier and tire compartment on the rear deck of Pierce-Arrow roadsters is shown in the lower illustration. The tire compartment door is shown in the open position*







Extra luggage space in the back of the front seat of the Winton touring cars. One of the compartment doors is shown open. Notice also the tonneau light



How the spare wire wheel is carried on the Premier roadster. A well is provided on the rear deck as shown above, this being large enough to take care of half the tire

the bodies in the Grand Central Palace is a Cole roadster of unusual lines which the attendants call a cubist roadster, and the name seems to fit. Practically every line about it is horizontal and every surface is almost a dead flat surface; all angles are sharp. The fenders are flat, horizontal, with a very sharp angle. The hood and cowl are raised to give a square, flat effect, and the rear deck is long and flat. A color combination of dull gunboat gray and vermillion striping gives a striking, if not beautiful effect. In this car disappearing mother-in-law seats are provided on either side just in front of the fenders. These slide in and out, disappearing into the side of the body. The rear deck provides storage space for luggage and also for two spare tires, the rear of the deck having a vertical door which permits the tires to be slipped in.

#### Roadster Bodies Enlarged

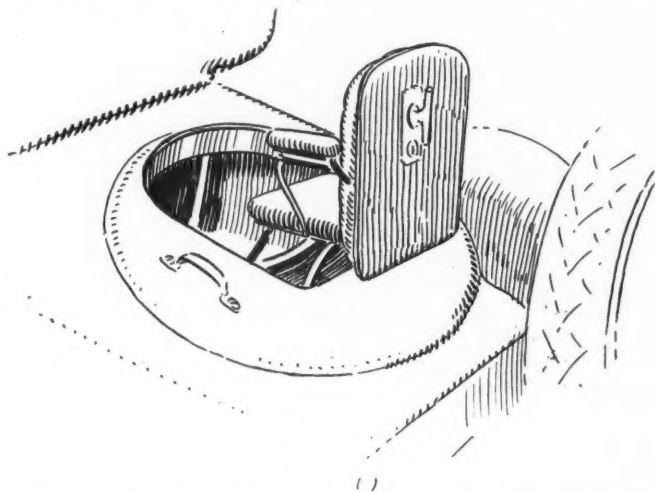
Also in the matter of seating there has been some strides made in providing for a third passenger in what normally is a two-passenger roadster. This is accomplished by cutting away the center of the ordinary seat and making a third seat in the

center and further back. In the Briscoe three-passenger car this has been accomplished with good results.

Carrying spare tires always has been a subject of a good deal of experiment on

running board and now is located at the rear of the car. Many of the newer types have provided space within the car body proper for carrying the extra tire or wheel, as the case may be. Such arrangement is

The rumble seat on the rear deck of the Packard roadster when in position for use. The seat may be folded down into the deck and in this position the back of the seat becomes part of the deck surface

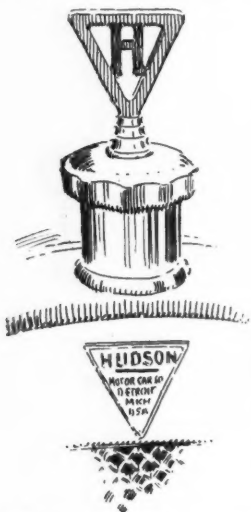


the part of both the engineers and the body designers, who found it difficult to provide a strong and workable tire holder location without having it interfere with getting into or out of the car, and sadly marring the beauty of the lines. In almost every case, the tire carrier has been removed from its old-time place on the

that just described on the Cole. A similar one is used in the Pierce-Arrow coupe and a Velie coupe. A number of others have provided a sort of tire well in the deck of the two-passenger cars into which the spare tires and wheels may be placed so that they will not greatly interfere with the lines of the body. Such a one as that is employed on a Premier roadster, Hudson and others. Naturally the favorite location is at the rear of the axle, where the tires may be carried vertically, or nearly so. The carriers have been improved in the matter of strength and solidity by fastening them directly to extensions of the frame members.

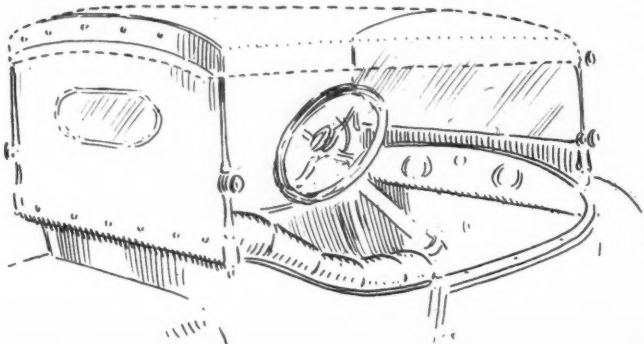
#### Inclosed Car Improvements

In the inclosed bodies the chief development has been in the smoother lines of the superstructure. This has been obtained to some extent by the use of curved glass windows, so that it has not been necessary to have flat surfaces in order to provide plenty of light. For instance, the Velie sedan has its front edges of glass, the wooden framing coming around in front instead of on the corner.



The new radiator cap on the Hudson which incorporates the letter H in the triangle

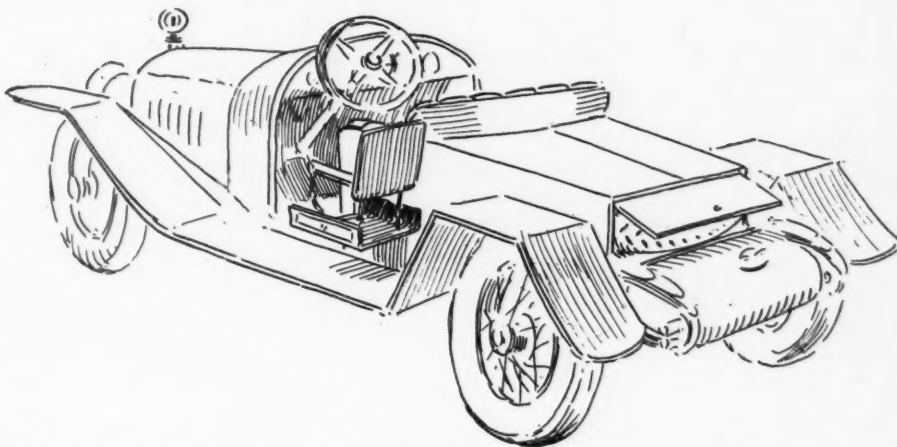
Below is shown the demountable top on the Chevrolet roadster. The top consists of a permanently attached rear curtain, which is mounted just like the windshield. In fact, it may be folded backward when not in use. Upon it and upon the windshield are the ordinary type of curtain buttons and the top proper is simply buttoned between windshields and rear shield



The streamline idea is carried out in the larger inclosed bodies by oval windows of long sweeping curves which match the curves of the body itself. In some instances this has given an impression of a rare combination of speed combined with roominess. The Pathfinder sedan is an example of how this impression is obtained. The long sweeping curves of the top and sides are modified by the fuller curves of the windows.

#### Convertible Bodies Are Featured

One of the features of the show is the number of convertible bodies which are to be seen on exhibition. Last year Premier had a convertible coupé roadster which it called a cabriolet, and Kissel also had a convertible two-passenger car. This year there is a convertible body of some sort in the exhibit of nearly every manufacturer which shows closed bodies. They are not only in two-passenger bodies but in the five and six-passenger ones as well. The convertible touring-sedans, as they are called, are distinctly an owner-driver proposition, they meet a need for the man of family who drives his car and wants



*Cole cubist roadster, a special design fitted with extra mother-in-law seats, which disappear into the side of the car. The use of sharp angles in the fender and rear deck design are responsible for the name*

were in evidence in that exhibit. Being designed to individual taste, they can hardly be considered as representative of any particular type of body-building, although they show the genius of the Locomobile's French body designer. However, the fact that

both the Locomobile and Cunningham make a specialty of built-to-order bodies is evidence of more thoughtfulness in catering to the personal fancies of customers, particularly in the higher-priced cars. Inclosed bodies illustrate the growing tendency toward providing for all needs, fancied or real, of their passengers. Vanity cases for women passengers, smoking sets for men, umbrella

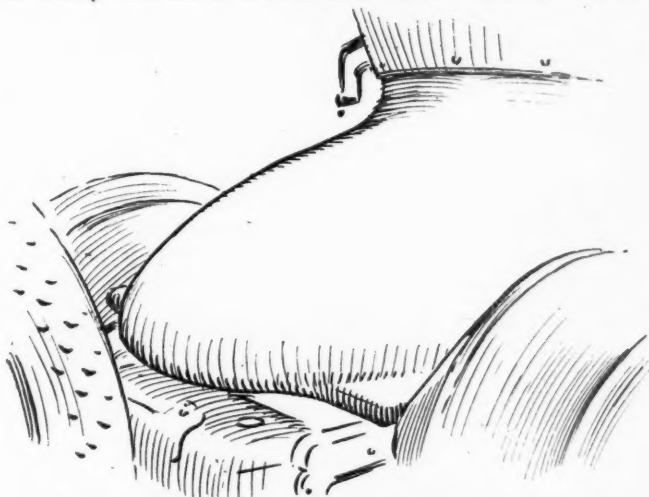
as would be found in a touring car with a top up. The use of glass has been extended even to the roof in the new Lewis sedan in which there is a skylight over the forward seats. This may be covered by a silken curtain. Minor developments in the closed cars will be taken up at length in another issue.

#### NEW SCHEME FOR CHICAGO

Chicago, Jan. 4—If safety-first advocates of Chicago have their way, all motorists of Illinois will carry individual judgment books and habitual speeders will serve time in jail instead of paying fines for their highway misconduct. This was the sentiment at a recent conference of representatives of local organizations which have become alarmed at the increase in motor car accidents and fatalities. As a result, the state legislature and the Chicago city council will be asked to pass more stringent laws governing traffic.

If the recommendations of the conference are adopted, every motor car driver in Illinois, be he private owner or public chauffeur, will be required to carry a book in which will be written his misdeeds with his car. When a motorist is arrested for violation of a state or city ordinance, the book will be handed over to the trial judge who will read the notations of previous offenses made therein by court clerks. If the book shows that the offender is up for a third time, he will be sentenced to serve time and in addition his license will be revoked. Driving of a car by an intoxicated person, even if he is able to steer the machine without running afoul of pedestrians, also will be punished by a jail sentence.

The advocates of these drastic reforms also have demanded that pedestrian traffic, especially in the Chicago loop district, be controlled by the police as vehicle traffic now is handled and they have asked that a law be passed forcing pedestrians to obey the police whistles at the street intersections the same as the drivers of motor cars and horse-drawn vehicles.



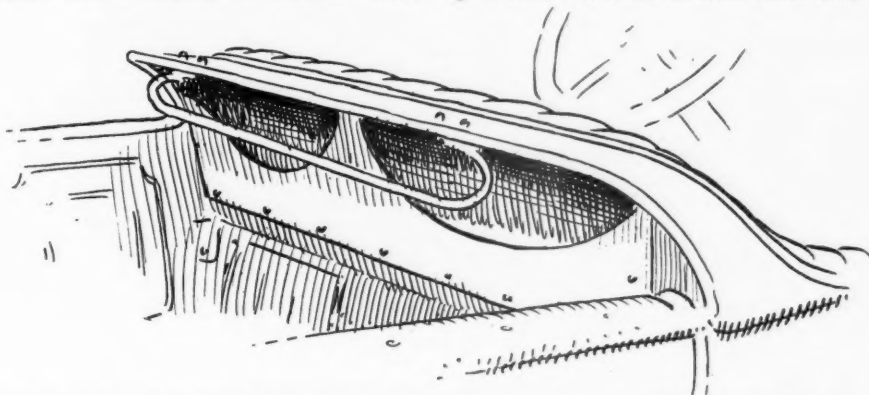
*Torpedo-shaped turtle back used on the Lexington roadster*

comfortable driving in winter as well as summer, but cannot afford the expense of two cars or two separate bodies. Among those showing combination sedan-touring cars are Hupmobile, Pathfinder and Krit.

The special built-to-order body department of the Locomobile was well represented and a number of unusual bodies

and parasol holders and flower vases are more in evidence than before.

There is more glass in bodies this year, increase in window space being quite appreciable. Practically all of the windows are sashless, and most of them arranged so that they can be raised or lowered, and give almost as much airiness when lowered



*Overhanging cowl on the McFarlan front seats. This cowl is fitted with two pockets to be used for carrying touring necessities such as goggles, veils, etc.*



# Electrical Appliances Headliners of Accessory Display

## Advancement Made in Field of Motor Car Fitments

NEW YORK, Jan. 4—Accessory exhibits at the Grand Central Palace are accorded as much of the time of the visitors at the motor car show as are the car exhibits themselves. Naturally there are more of them than there are cars and there is a wide and interesting variety. For the present owner of a car the two upper floors of the exhibition hall offer much to hold attention.

As has been the case for the past 3 years the starting and lighting outfits show the most in the way of new ideas and changes of any department of the accessory field. This probably is because the starting and lighting feature is such a comparatively new movement that there is opportunity for much development in this line.

### New Motor-Generators Announced

Several new motor-generators have been brought out, for small cars and Fords especially. Some new two unit systems for Ford machines are also exhibited. Refinement both in outward appearance and in design, material and finish is found on every hand. The 1915 machine is better looking, more efficient, lighter and better provision has been made for driving. This applies to both starting motors and generators. More attention has been given to voltage regulation, and many other small refinements are noted.

Three new carbureters are exhibited and refinements have been made in several designs carried over. Still others have been put on the market for 1915 without a change. The horizontal connection and double outlet carbureters are noticeable additions.

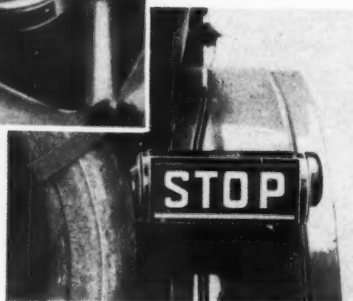
Little change is found in the magneto field. Few new models have been brought out. In ignition the timer-distributor is gaining favor and several makers are exhibiting these in unit with the generator for the first time.

A brand new Ford starting and lighting system has been brought out by Gray & Davis, Boston, Mass. It is a single-unit system and supplants the two-unit system for Ford announced a few weeks ago. This is a radical departure for this concern which has heretofore made only two-unit systems. In addition, two new generators and a new starting motor are exhibited. The generators are entirely new in design and are of the variable-speed type, instead of having a constant-speed governor drive as heretofore.

The Kemco line has been enlarged so that it now includes starting motors and generators of different types as well as the original fan generator which is associated with the Kemco name. The 6-volt system is used in all units. The complete line consists of four starting motors of graded sizes and four different powered motors. There is a universal starting motor which

is designed especially for cars already in use. It is mounted in front of the radiator taking the place of the starting crank. The reduction gears are contained in the starting motor casing. A smaller edition is made for Fords, and in connection with a fan generator makes a complete starting and lighting system. These machines are made by the Kemco Electric Co., Cleveland, O.

The General Electric Co., Schenectady, N. Y., has brought out a 12-volt motor-generator known as the Genemotor. The machine is designed especially for Fords and sells complete without lamps for \$80.



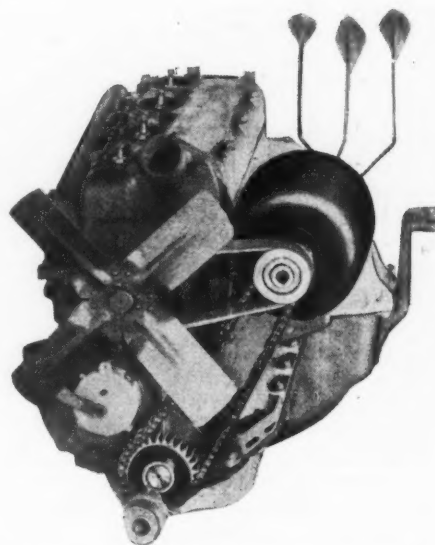
Nokohyd safety signal operated by steering control. When handle is turned to S the word STOP appears. L and R show LEFT and RIGHT

A. J. Pickard & Co., New York, is the sole distributor.

The Genemotor is mounted on the left side of the motor, the drive is by silent chain from a sprocket on the crankshaft. The instrument may be attached without drilling or tapping of holes. The regulation of the charging current for the battery is accomplished without the use of external regulators, the field windings of the Genemotor itself giving the regulation. The motor starting switch is mounted on the top of the machine and is actuated by a push rod on the dash. The cutout closes at 9 miles per hour.

### Apelco Has New Features

The Apelco line is replete with new features. There is an entirely new motor-generator, built in three sizes, one of these being used in a special Ford installation. In addition there is a separate starting motor and two generators. The standard voltage of the motor generator for starting is 12 and for lighting 6, the change from one to the other being accomplished by a series-parallel switch. The motor-generator is mounted on the left of the motor and is driven through a silent chain. The voltage regulation is inherent and there



Motor-generator brought out by the General Electric Co. It is a 12-volt instrument

is a cutout with a charge indicator on the dash.

The feature of the Westinghouse line is a motor-generator. Refinements are found in the other units. The motor-generator is a 12-volt machine and in this respect differs from former practice. It is geared permanently to the engine. No cutout switch is used and at low engine speeds the generator therefore automatically becomes a motor, so in case the engine is stalled it is automatically started. Starting motors and generators both with and without ignition units are continued with slight refinements.

### Brown-Lipe Enters Field

A new type of starting motor which is mounted at the side of the gearset and which drives through the clutch has been developed by the Brown Lipe Gear Co., Syracuse, N. Y. By the movement of a heel pedal the gear is first meshed and the switch closed.

A high-speed starting and lighting system for Fords is the latest shown by the Hartford Suspension Co., Jersey City, N. J. Motor and generator are separate units, the generator being mounted horizontally and the generator being driven from the front of the generator through a worm gear. The cranking speed is about 300 r. p. m. and the voltage is 12.

A lighting generator for Fords is exhibited by the Charles A. Jackson Co., Boston. It is mounted on a special bracket and is driven by a wide belt which also drives the fan. Its weight is 9 pounds and it gives 8 amperes at 7 volts at a normal speed of 1,800 r. p. m.

A new electric starting and lighting system designed for application on old cars is shown by the Chicago Electric Specialties Co., Chicago. Special fixtures are sup-

plied for attaching the outfit to different makes of cars, the Ford attachment being the one pushed at present. The same unit is employed for all. This is a 6-volt motor-generator and is driven by silent chain from the front of the crankcase. An unusually attractive feature is the combination of a tire pump with the unit, in such a way that the starting, lighting and tire inflation are accomplished by the same instrument.

#### New Carbureters Shown

A new carbureter of unusual design, in that the float chamber has been discarded, is the M. F., manufactured by the Floatless Carbureter Co., Brooklyn, N. Y. The main air inlet is at the bottom and to one side. At slow speed the air rushes up through this passageway, past the spray nozzle, lifting a small disk which is attached to the needle valve. When the motor is idle this valve is forced closed by a flat spring, but when the motor is running the suction raises the disk and allows gasoline to flow out of the nozzle, the amount depending on the height of the disk.

There are no springs in the new Shakespeare carbureter, made by the William Shakespeare, Jr., Co., Kalamazoo, Mich. The float is concentric and the flow of gasoline from the fuel nozzle is regulated by a movable needle which is attached to a floating disk. Increased suction raises the needle and allows more fuel to flow. At the same time, the raising of the disk increases the annular opening, allowing more air to flow.

Two Stromberg models which were recently announced are on exhibition. One is the K, a single-jet instrument which is featured by a balanced air valve construction which takes the place of the auxiliary air valve. The other is the H, and it is notable in that it uses a dash-pot control of the air valve is a double-jet type.

The carbureter which is exhibited by the Light Mfg. and Foundry Co., Pottstown, is known as the Parkin. It has no spring and there is but one air inlet. The mixture is controlled by a special type of throttle valve and a single jet whose opening is controlled by the position of the throttle. Easy starting is provided by means of a choke valve in the air intake.

Rayfield carbureters are shown in two types, the G and the L. This is the first time they have been exhibited, as they have been brought out since the last show. The two types are identical except that the G is water-jacketed. Both models are of the two-jet type.

In addition to its two standard models the Zenith company has added a new type which is built for the small car trade and sold at a lower price, although retaining standard Zenith features. Double outlets for eight-cylinder motors are shown.

The Browne carbureter is a newcomer in which the principal feature is an auxil-

iary air valve in the form of an aluminum cup by which a constant ratio between the fuel and air is maintained. Only one size of carbureter is made for all makes of cars, and the only change for different motors is to put in a new bushing which surrounds the auxiliary air valve and controls the area of the auxiliary air opening.

#### Improvements in Shock Absorbers

The new shock absorbers have been developed by the Triple Action Spring Co., Chicago, one for electric cars and the other for trucks. In both cases the new feature is the addition of a third coil.

A new model has been brought out by the Universal Shock Eliminator Co., New York, in which the coil spring is unusually long and large. It is inclosed in a vertical casing designed to be mounted at the front end of the leaf spring.

A feature of the Hartford Suspension Co.'s exhibit is the new multiple-disk friction shock absorber which automatically increases in stiffness according to the severity of the blow.

Along with the shock absorbers proper, the Dann Oil Cushion Spring Insert Co. has developed a spring, in which much of the shock is said to be eliminated by constant lubrication between the leaves. This is accomplished by making up springs for the trade, with the oil inserts in place. The lubrication also lessens spring breakage.

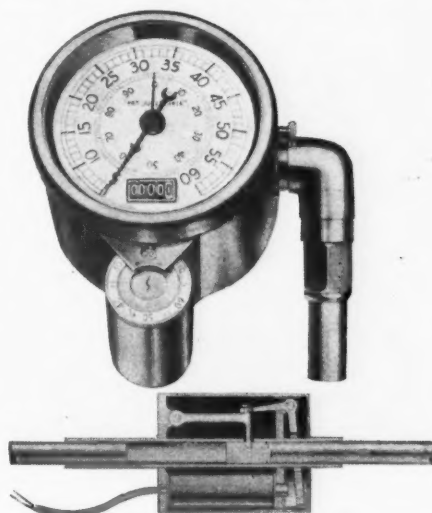
A similar effect is the object of the Brown Oilbox which offers an easy means of feeding oil between the leaves.

Two new models have been added to the line of bumpers made by the J. H. Sager Co., Rochester, N. Y. Both feature a method of passing the bar to the arms. The bar is of modified channel form.

The latest Grossman bumper for Fords is designed to provide substantial attachment and also to improve the appearance.

#### Odd-Designs in Tire Pumps

A new motor-driven tire pump is shown by the Brown Co., Syracuse, N. Y. It is called the Sanford and sells for \$8.50 complete with gear, hose and gauge. It is suitable for tires up to 34 by 4.



New Hoffecker speedometer, which has a speed-regulating attachment called the Speedlock

The Kellogg Mfg. Co., Rochester, N. Y., has brought out a combination tire pressure gauge and air purifier.

The most recent Mayo design is the valve cap type which is operated by the compression of the motor but instead of screwing into the spark plug opening is horizontal and is permanently attached to a valve cap hole. It sells for \$15 complete with equipment.

The Hartford Machine Screw Co., Hartford, Conn., has introduced a single-cylinder pump. The two-cylinder model will be continued. The single will inflate a 34 by 4 tire to 80 pounds pressure in 2 3/4 minutes, it is claimed.

#### Windshields of New Type

The Fryer-Auster Co., Providence, R. I., makes a tonneau windshield to protect the occupants of the rear seat. It consists of three sections which are hinged together and are carried on two adjustable arms which attach to the back of the front seat. An apron of heavy water-proof twill is furnished for attachment to the lower edge of the shield so that the passengers may be fully protected against drafts.

A new two-pane windshield is made by the English & Mersick Co., New Haven, Conn. Either pane can be turned in any direction. Four thumb nuts, two on each side, hold the sections in position.

#### Tops Offered at the Show

The Golde Mfg. Co., New York city has introduced a one-man top for roadsters



A new safety signal, the Auto Signallite. By operating a small lever fastened to the steering post the rear signal may be made to show RIGHT, LEFT, or STOP, and when turned to the off position the signal is clear. It sells for \$20

The principle is the same as that employed in the larger tops.

A one-man top for Ford cars is shown by the Perkins Campbell Co., Cincinnati, O. It is priced at \$45. It is equipped with quick-adjustable curtains. Mohair or leather are the materials used for covering.

#### New Champion Spark Plug

A new spark plug with a one-piece porcelain is the feature of the Champion line.



The new plug consists essentially of two pieces, the shell and the large, thick porcelain insulator in which is cemented a heavy center electrode. The points of the spark plug are constructed from special nickel-manganese steel alloy which has high heat-resisting qualities. The price is \$1.25.

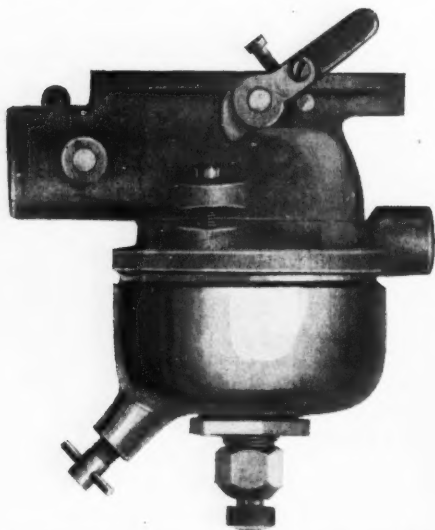
A new spark plug has been brought out by the Brown Co., Syracuse, N. Y. It is a conventional design with a porcelain insulator. Price, 75 cents. The Benford Mfg. Co., Mount Vernon, N. Y., is showing a Monarch special Overland plug which is the same as the other plugs except that it has a long shank. The price is 75 cents. Charles E. Miller has brought out a porcelain spark plug listing at 50 cents. It has a blue steel shell and a two-point electrode.

#### Glare Reducers at Palace

A headlight ray controller which is designed to shade the light but not dim it is made by H. F. Mulcahey, Providence, R. I. The upper inside of the glass is frosted to a point below the center, diffusing the rays above the horizontal but not those below. It is made with flat or curved glass.

By throwing the reflected light down on the road the troublesome glare is avoided, it is claimed, in the lamp made by the Hampton Glareless Lamp Co., New York. The rays from the bulb are cast ahead in parallel lines.

The Hick-Meyer Deflector Co., Toledo, O., shows a device which is placed over the lower part of the bulb so that the rays are deflected to the upper part of the



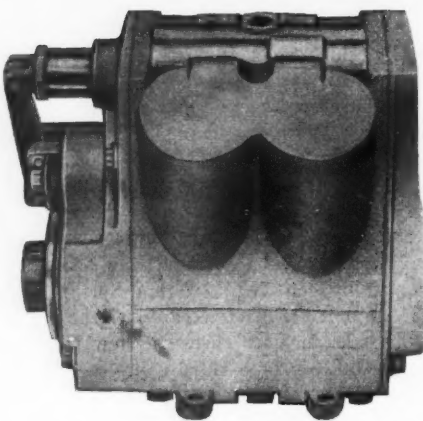
Shakespeare carburetor, a new type brought out at the show

reflector, where they are cast down to the road. The price per set is \$2.

#### Van Sicklen Ford Speedometer

Van Sicklen speedometer for Ford cars is the feature of this company's exhibit, made this year for the first time. Other interesting features are a new swivel drive to the front axle spindle of the Ford and a gearset drive by worm for other cars.

Corbin-Brown centrifugal speedometers for 1915 are shown with a new feature, a



The Perfect air starter. It also is used as a tire inflator

selective trip reset on the odometer, by which it is possible to set the trip wheels at any mileage.

Formerly Elyria-Dean, Garford speedometers are little changed, but several new flush types have been added.

The Hoffecker-Evans speedlock instruments have been changed this year. Last year the speed lock served to interrupt the ignition when the speed exceeded a set maximum. This year, however, the governor acts on the throttle control rod.

#### Clocks, Rims and Wheels Shown

A new Stanweld rim made its debut at the show. Its chief points of difference are that the side flanges once applied to a casing remain permanently with it as long as it is used, not being removed in changing tires. These rings are not split. The felloe band has but one beveled face, that to the rear.

The latest Stewart accessory is the 1-year self-winding electric clock. It is a flush type and carries a small dry battery at the back. A contact maker closes the battery circuit once every 2 minutes, the current energizing a magnet whose armature rewinds the spring.

Parker pressed steel wheels, made of two sheets of metal welded together and pressed to shape, was the feature of the Hydraulic Pressed Steel Wheel Co., Cleveland, O. Advantages claimed are light-



Brown four-cylinder, vertical, opposed motor-driven tire pump

ness and the elimination of the ordinary felloe band, the rim of the wheel taking the place of the band.

Designed for the purpose of enabling any car which has broken any of its four axle spindles to be towed to the nearest repair town, the Autorecue, made by the Autorecue Mfg. Co., Streator, Ill., consists of an arm which is clamped to the axle and carries the wheel spindle.

A new exhibitor is the American Die and Tool Co., Reading, Pa., which had on display a new bevel-drive rear axle for light cars. It is made in two sizes, with capacities of 1,000 and 1,400 pounds. The treads are 44 and 56 inches and in one piece.

#### Bosch Displays New NU4

A new model of magneto is shown by the Bosch Magneto Co. This is the NU4. It is for motors of 30 horsepower or less and sells for \$40. The usual distributor is eliminated, distribution of the high-tension current being effected by a double slip ring with metal segments which carry the current to the four plug leads. This model is part of a new Ford outfit equipped with gear drive. The secondary winding is carried to the slip ring. Another new Bosch product is a vibrator system designed to make starting easy in cases where the cranking speed is low and the spark weak.

An entirely new magneto, the Cunningham, is shown by the Splittorf Electrical Co., Newark, N. J. It is a waterproof, high-tension instrument and is designed to produce a hot spark at very low speeds. It also has a timing range of 75 degrees.

#### Field of Tires and Vulcanizers

Two new Shaler vulcanizers are on display. They are similar except that one is a Ford model. They are designed for roadside work. The correct amount of heat is obtained by a lamp, which burns gasoline or alcohol.

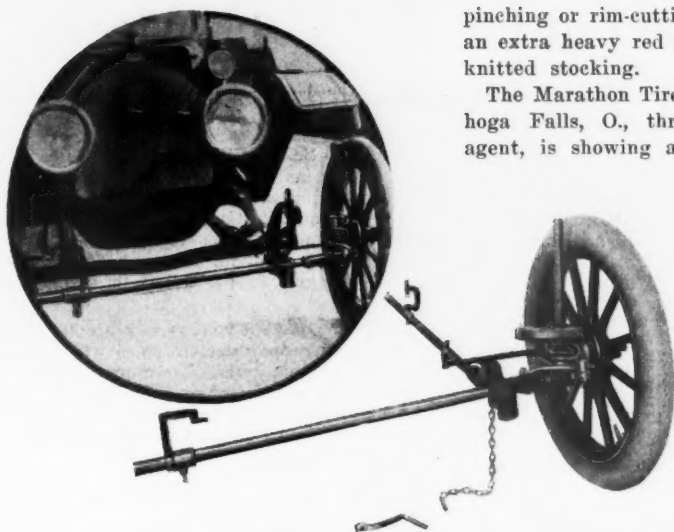
D-M anti-skid traction treads are designed for solid dual tires and are made by the Dayton Malleable Iron Co., Dayton, O. Each tread consists of a flat surface, with a ridge to prevent skidding. The flat surface rests against the tire and the units are connected by hook and eye joints.

A tire having an unusual tread is the Mussinan, made by the Mussinan Tire Co., New York. In this the tread is arched or concave instead of convex, so that only the edges bear on the road.

A newcomer in the tire field is the Gordon Rubber Co., Canton, O., maker of Gordon tires. The feature of the line is the triangle tread. This is a non-skid design with a triangle-shaped raised portion.

A new non-skid tread has been brought out by the Braender Rubber Tire Co., Rutherford, N. J.

A pneumatic tire is exhibited by the Dayton Rubber Mfg. Co., Dayton, O. This concern is continuing its airless tire. The pneumatics are guaranteed for 5,000 miles.



*Autorescue, a device for enabling broken-down cars to be brought to a garage*

Economy tubes are the new product exhibited by the Dujardin Co. These tubes are said to be proof against blowing out,

pinching or rim-cutting. They consists of an extra heavy red tube, reinforced by a knitted stocking.

The Marathon Tire & Rubber Co., Cuyahoga Falls, O., through its New York agent, is showing a new non-skid tread

consisting of a number of V-shaped rubber projections distributed evenly over the tread at varying angles.

## Ferro Company Announces Eight-Cylinder Motor

**A**N eight-cylinder motor with valves in the head has been brought out by the Ferro Machine & Fdry. Co., Cleveland, O., and it is exhibited at the Biltmore Hotel, New York. This is the first time this construction has been used in a commercial eight-cylinder motor. Many other interesting features are also noticeable in this machine which is built in two models rated at 45 and 60 horsepower, the latter has a bore and stroke of 3.25 by 4 and the former 3 by 3.5.

Except for the difference in size the two engines are identical and one description will do for both. Both cylinder blocks and the top half of the crankcase are cast in one piece, the valves being in a detachable head. The rocker mechanism is completely inclosed in caps which are bolted to the heads.

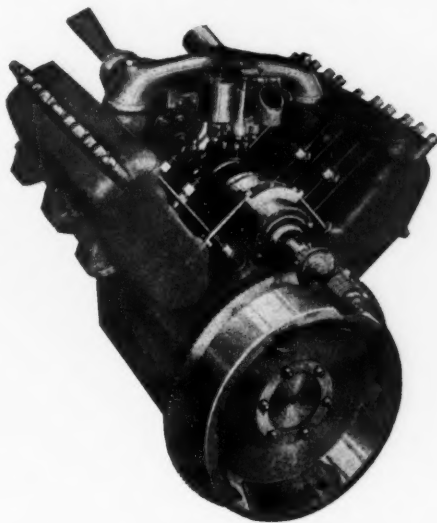
Extreme accessibility has been obtained in this motor by the valve-in-head construction which allows the exhaust pipes to be

carried on the outside of the cylinder blocks. The intake manifold also incorporates the water outlet from the cylinders and in this way one pipe is made to do the work of two. Further simplification has been obtained by driving the generator and two-bladed fan by a single 2-inch belt, the generator, of course, being mounted directly back of the fan between the V. The starting motor is placed at the rear end between the cylinders and drives through the flywheel. In between these two electrical units is the timer distributor which may be any standard make

Many details of this motor are new. The cover which incloses the valves is bolted tight so that it is noise-proof and dust-proof and retains the oil. It gives the impression that it is an integral part of the cylinder castings. These cover plates are held by three studs. The valves are operated by pressed steel rocker arms which is an innovation. These are roughly of channel shape. Another feature is in the pivoting of these rocker arms. Instead of using a pin, a ball and socket joint construction is employed. The ball is formed on the end of a stud which is bolted to the valve cover plate and the socket is pressed into the rocker. The studs just mentioned are hollow and are equipped with ball-closed oil holes, thus the ball joints can be easily oiled through these holes. The studs are adjustable so that the proper clearance between rocker arm ends and the valve stem and push rod can be maintained.

### Sixteen Cams on One Shaft

A single camshaft with 16 cams is used. It is driven by a pair of large helical gears direct from the crankshaft. By the use of a cam for each valve, the necessity for the use of valve levers is eliminated. Roller cam followers are used. It is stated that with the sixteen cam construction this motor is as easy to time as a four.



*New eight-cylinder motor brought out by the Ferro company*

The cylinder head is held by eight bolts, four on each side.

As already stated the intake manifold and water outlet pipe are combined in a single aluminum casting. The thermosyphon system is used. The intake passage being inside of the water passage. This insures good vaporization, as the walls of the manifold are always at a high temperature. The manifolds slope from the center towards both blocks so that any liquid fuel which is carried from the carbureter does not tend to collect but flows into the cylinders.

The outlet water connection is at the center of the casting on the outside.

The exhaust pipes are on the outside of the castings, there being three outlets from each cylinder, individual outlets from the end ones and one outlet for the center cylinders.

The pistons are fitted with three rings, two near the top to hold the compression and a larger ring around the wrist pin which has a double function; to retain the wrist pin and to prevent from scoring the cylinders and to hold compression.

### Connecting Rods Are Forked

The connecting rods are of the forked type, there being one connecting rod bearing for two connecting rods. The crankshaft is carried on three main bearings of phosphor bronze and so is the camshaft.

Lubrication is by a force-feed system, there being a gear pump at the front of the motor on the left side which draws oil from the bottom of the crankcase and forces it through four oil leads to the main bearings, from whence the oil is distributed from the connecting rod bearings to drilled leads in the crankshaft. To insure an even distribution of oil to the four connecting rod bearings, four main leads are used. The two leads run to the two end bearings from whence oil is carried to the adjacent connecting rod bearings. The other two leads go to the center main bearing where one lead distributes oil to the second cylinder connecting rod bearing and the other to the connecting rod bearing of the third cylinder.

The firing order is as follows: Right 1, left 1, right 3, left 3, right 4, left 4, right 2 and left 2.

### HOOD COMMON STOCK INCREASED

Boston, Mass., Jan. 5—The stockholders of the Hood Rubber Co. have voted to increase the common stock from \$1,000,000 to \$2,000,000 out of surplus. The directors later voted to issue \$150,000 of additional preferred stock. This makes the total amount of preferred stock outstanding \$2,300,000.

### OWEGO ADMITS BANKRUPTCY

Owego, N. Y., Jan. 4—The Owego Car Co., Inc., manufacturers of the Owego cyclear, with a plant in Owego and offices in New York city at 286 Fifth avenue, has filed a petition in bankruptcy in the latter city with liabilities of \$43,642 and assets of \$25,078.



# Tires and Wheels as Discussed at the S. A. E. Meeting

## Inflations of Pneumatics and Weights to be Carried

IT has been stated that an oversize tire properly inflated will not last longer than a regular size tire pumped to its regular inflation pressure. The oversize tires with larger cubical contents or air space, will perform a greater amount of work because there is less heat developed in them. They will pass over stones and receive the shocks of the road with less danger of breaking the tire fabric, because of the additional amount of cushion in the air within it. They are less liable to puncture because of their additional strength and carrying capacity, which not only increase the tire life but afford easier riding.

Tire manufacturers have found from experience that tire inflation of 20 pounds per cross-sectional inch will give the longest life under normal conditions. For example:

|                      |            |
|----------------------|------------|
| 2 1/2-inch tire..... | 50 pounds  |
| 3-inch tire.....     | 60 pounds  |
| 3 1/2-inch tire..... | 70 pounds  |
| 4-inch tire.....     | 80 pounds  |
| 4 1/2-inch tire..... | 90 pounds  |
| 5-inch tire.....     | 100 pounds |
| 5 1/2-inch tire..... | 110 pounds |

They are trying to educate the user to see that his tires are kept inflated to this pressure by taking readings with a tire pressure gauge, of which there are several reliable makes on the market at a moderate price. Adjustments are being made on this basis. As in years gone by, many tire users do not have a pressure gauge, but judge the proper inflation by kicking the tire to see whether it is hard enough. In most cases where this crude method is used and a tire gauge is afterwards applied it is found that the tires were from 30 to 50 per cent under-inflated. There is, however, a great reduction in the number of complaints along this line today.

Practically all the tire manufacturers use a nearly uniform table, giving the weight of the different sized tires are designed to carry at a stated inflation pressure. If tires were used in accordance with this table, the pros and cons of tire inflation would be reduced to a minimum, and the owners of cars would not be complaining about short mileage.

The following tabulation shows the weights to be carried on tires, the cars to be weighed without passengers or baggage:

*Editor's Note—Extracts from paper read at the annual meeting of the Society of Automobile Engineers, New York, January 6 and 7, 1915, by Charles B. Whittelsey, secretary and factory manager of the Hartford Rubber Works, Hartford, Conn., which is a part of the United States Tire Co.*

|               | Rear Weight | Front Weight |
|---------------|-------------|--------------|
| 28x2 1/2..... | 225 lbs.    | 275 lbs.     |
| 28x3.....     | 350 lbs.    | 425 lbs.     |
| 30x3.....     | 375 lbs.    | 450 lbs.     |
| 32x3.....     | 375 lbs.    | 450 lbs.     |
| 28x3 1/2..... | 425 lbs.    | 500 lbs.     |
| 30x3 1/2..... | 450 lbs.    | 550 lbs.     |
| 31x3 1/2..... | 475 lbs.    | 575 lbs.     |
| 32x3 1/2..... | 500 lbs.    | 600 lbs.     |
| 33x3 1/2..... | 525 lbs.    | 625 lbs.     |
| 34x3 1/2..... | 550 lbs.    | 650 lbs.     |
| 36x3 1/2..... | 600 lbs.    | 700 lbs.     |
| 30x4.....     | 625 lbs.    | 750 lbs.     |
| 31x4.....     | 635 lbs.    | 775 lbs.     |
| 32x4.....     | 650 lbs.    | 800 lbs.     |
| 33x4.....     | 675 lbs.    | 850 lbs.     |
| 34x4.....     | 700 lbs.    | 875 lbs.     |
| 35x4.....     | 735 lbs.    | 885 lbs.     |
| 36x4.....     | 750 lbs.    | 900 lbs.     |
| 40x4.....     | 850 lbs.    | 1,000 lbs.   |
| 42x4.....     | 900 lbs.    | 1,050 lbs.   |
| 32x4 1/2..... | 750 lbs.    | 950 lbs.     |
| 34x4 1/2..... | 900 lbs.    | 1,125 lbs.   |
| 35x4 1/2..... | 935 lbs.    | 1,175 lbs.   |
| 36x4 1/2..... | 975 lbs.    | 1,225 lbs.   |
| 37x4 1/2..... | 1,010 lbs.  | 1,260 lbs.   |
| 38x4 1/2..... | 1,050 lbs.  | 1,300 lbs.   |
| 42x4 1/2..... | 1,200 lbs.  | 1,450 lbs.   |
| 34x5.....     | 950 lbs.    | 1,200 lbs.   |
| 35x5.....     | 1,000 lbs.  | 1,250 lbs.   |
| 36x5.....     | 1,050 lbs.  | 1,300 lbs.   |
| 37x5.....     | 1,100 lbs.  | 1,350 lbs.   |
| 39x5.....     | 1,200 lbs.  | 1,450 lbs.   |
| 43x5.....     | 1,400 lbs.  | 1,550 lbs.   |
| 37x5 1/2..... | 1,150 lbs.  | 1,400 lbs.   |
| 38x5 1/2..... | 1,200 lbs.  | 1,450 lbs.   |

The heat generated within a tire has much to do with the air-pressure used—the faster the speed the greater the heat. The greater the heat the greater the strain, on account of the expansion of air within the tire. Continuous driving generates excessive heat, as well as driving in hot weather. Excessive heat is injurious to the shoe and causes rapid deterioration. If there is not sufficient volume of compressed air within the tire, due to using an improper size, to absorb all of the shock and vibration, the surplus shock and vibration is transmitted to the car and, therefore, shortens the life of the car. The greater the volume of air in a tire, the less the increase of heat and strain when driving

under climatic conditions which produce excessive heat, as well as when driving at great speed or doing heavy work.

A tire should be sufficiently large not to flatten at the point of road contact more than 14 per cent of its sectional diameter or on an average 12 per cent, to give good service.

A tire of sufficient volume to properly carry a load with proper tire pressure will, if not properly inflated, deteriorate much more rapidly from excessive flexing, causing the fabric to break down quickly, and is much more liable to puncture. Still the user closes his eyes to these facts, when he considers only the personal comfort of the occupants of the car, for he well knows that an under-inflated tire will give greater riding comfort as it absorbs the vibration and shocks more quickly and thoroughly. After he has driven his tire under-inflated and received a much less than normal mileage from it he is brought face to face with the increase in tire expense which he has brought upon himself.

The personal equation of the driver has to be considered; the tendency not to see that the tires are properly inflated; the manner in which he drives. The service of the car, whether for light or heavy work, the climate and seasons, the geographical location, the type of road bed, the use of shock absorbers, the spring equipment and the distribution of the load of the car, are also factors. Some motor car manufacturers are inclined to equip their cars arbitrarily with tires not sufficiently large to perform the required service, unless inflated to a pressure making them so rigid as to cause the cars to ride as though equipped with solid tires. This is a short-sighted practice, for the reason that if the user keeps his tires inflated excessively, he shortens the life of his car and increases his car repair bill, and the car maker does not retain the good will of his customer, as he would by putting on tires of sufficient cubical content. This condition caused the tire manufacturers to design what is commonly known as the oversize tire, which was first purchased by the car user after he found out that his car was under-tired, and has since been adopted by many motor car manufacturers.

## As the Wood Wheel Man Sees the Wire Wheel

THE wire wheel had its origin abroad, and was at its inception a necessity because of shortcomings in connection with the wood wheel. The wood material available was inferior in quality and not entirely suited for the purpose. Knowledge of the proper way to treat the wood to preserve its natural strength was lacking. The methods of assembly were not so widely understood as in America. Because of these handicaps the European maker turned his attention to other materials than wood, and the wire wheel made its appearance, which would be expected under the conditions.

The wire wheel has not met with marked success in America, and the action of car makers who after trying wire wheels have reverted to wood wheels is significant. Statistics on the relative use of wood, wire, and steel wheels in four of the leading motor countries show that the wood wheel is leading in all, and that only in Great Britain is the wire wheel a considerable factor, being 36 per cent, as compared with 44 per cent wood wheels and 18 per cent for steel wheels. The following are the complete figures:

*Editor's Note—Extracts from paper presented at the annual meeting of the Society of Automobile Engineers, New York, January 6 and 7, by R. B. Mudge, chief engineer of the Hayes Wheel Co., Jackson, Mich.*

|                    | Wood | Wire | Steel |
|--------------------|------|------|-------|
| Great Britain..... | 44   | 36   | 18    |
| Germany.....       | 76   | 9    | 15    |
| France.....        | 78   | 17   | 5     |
| United States..... | 98   | 2    | 0     |

The success of the wire wheel is questionable. In England tests made by wire wheel interests seemed to indicate superior strength as compared with wood wheels made of English oak. Further, tire test made in London showed greater mileage on wire wheels, although these tests can scarcely be accepted as conclusive, because they were over paved city streets entirely.

After its use abroad, the wire wheel was introduced into the United States, where conditions are different. The wood artillery wheel in general use here was rendering satisfactory service, and there was little inducement to take up the innovation of doubtful performance even under road conditions far

more favorable than those to be encountered in America. Thus the burden of proof remained with the wire wheel advocates, and up to the present time the same situation prevails.

One point is that of the relation of the life of a tire to the type of wheel on which it is used. Many unqualified assertions have been made as to the great saving due to use of wire wheels. It is pointed out that being lighter, the total unsprung weight of the car is less; that having less peripheral weight, the flywheel action is reduced; that possessing greater resiliency, there is more give in sudden starting and stopping; that the so-called suspension principle gives greater distribution of load.

Comparisons made between wood and wire wheels, designed for the same car, and equipped with the same type of rims in each case, have demonstrated that there is little or no difference in weight between the two. The wood wheel is often placed in a somewhat disadvantageous light by taking its weight equipped with one of the heavier types of demountable rims, as against the

wire wheel equipped with only a simple light clincher rim. This is likewise the condition under which the peripheral weight is shown greater on the wood wheel.

It seems to be a popular idea that the wood wheel is a rigid, unyielding structure, while the wire is springy and resilient to a high degree. The real state of affairs is somewhat different, as has been proven beyond a doubt in a number of tests, made in outside laboratories by disinterested parties. The wooden unit, with its springy arches of tough, seasoned hickory, and its spokes united in a peculiar interdependent bond at the mitre, does not take up the load at the one point of contact only, but distributes it over the entire lower half of the wheel in varying proportions. In actual test, the load sustained by the wheel averages about  $2\frac{1}{4}$  times the strength of a single spoke, or in other words, each spoke in turn assumes less than 45 per cent of the total load.

The wire wheel, being composed of tension members, takes all the load in the upper half of the wheel, and the lower half offers no resistance against flattening of the rim, except the stiffness of the rim itself. The wire wheel people argue that their product has greater circularity than the wood wheel because of sixty or seventy points of support along the rim instead of ten or twelve. They say the wood wheel tends to become a ten- or twelve-sided polygon, while the wire wheel has so many members bearing on the rim as to maintain a perfect circle. Yet none of the members in the lower half of the wheel, where the blow is struck, can stand any appreciable compression, and they are therefore useless as far as preventing the wheel rim from becoming crushed down entirely is concerned.

Several tests were made at the University of Michigan, which bear out this point well.

and likewise demonstrate the true state of affairs as to ability to give under a shock and power of recovery after loading has been released. The wheels tested were for the same car, mounted on the same hubs, and both equipped with clincher rims. The wheels were placed between two heavy compression heads and crushed. The wood wheel flattened slightly on the rim after 8,000 or 10,000 pounds had been applied, but otherwise showed no distress until the breaking point was reached, when it started to go down and would take no higher loading. This was at 17,000 pounds.

The wire wheel behaved in a peculiar manner. The spokes bent almost immediately upon application of the load, and at 5,000 or 6,000 pounds the wheel was no longer in a condition to be of any use. Further load was sustained by the rim alone, which steadily flattened out across two-thirds the diameter of the wheel. At 8,000 pounds the rim steadily became crippled under continued pressure, without increase of load until flattened as above mentioned. Then the wheel took further loading up to 13,500 pounds. After release, the wood recovered to nearly the original circle. No recovery at all was apparent in the wire wheel.

Considering the alleged springiness of the wire wheel from another standpoint, let us refer to another test made at the same time. This experiment, termed the rim-dishing test, was designed to approximate as nearly as possible the conditions under which the wheel receives the shock in service when skidding against a curb. The wheels of the same type as in the foregoing test were mounted on their axles in each case, with the bearings in place, and the axles clamped securely, leaving the rim free all around. Then the load was applied at one point on the rim. The test was started at an initial loading of 100

pounds, and increased by increments of 200 pounds, with the deflection recorded after each additional loading. After every other reading the load was run down to the initial point and the amount of permanent set measured and recorded.

One striking point to be noticed is that while the deflections of the wood wheel were greater than the wire wheel, yet the permanent set was found to exceed that of the wire wheel but little, showing that the large deflection under load was due not to weakness, but rather to elasticity. The wood wheel sustained a considerably higher load than that at which failure occurred with the more rigid wire wheel.

A wheel has many times the strength of resistance against loading, as compared with skidding, curb impact, and strains of a like nature, and it is under the latter conditions that failure will occur, if at all. In speaking of the resistance against direct loading, let us mention, briefly, the surprising developments in a test made at the university along this line. A wheel and axle assembly was set up and the load applied exactly as though under a car. The load was run up to 24,000 pounds, and at that point the axle gave way in a sharp, clean break, with no flaws in the steel apparent. The wheel was slightly flattened at the rim and one spoke bent a little, but was otherwise intact. The wire wheel, subjected to an equal loading, became a misshapen wreck.

In every test made the wood wheel excelled in elasticity, in both dishing and compression, showed greater strength in a direction in which greater strength is vital; and displayed greater resiliency and recovery under direct pressure, a point in which wire wheel advocates have claimed superiority and on which they have largely based their claims to easier riding qualities and a longer tire life.

## As the Wire Wheel Man Sees the Wood Wheel

IN comparative tests made of wood and wire wheels where the wheels are of the same diameter and where similar types of rims are used, the wire wheel has shown less deflection than wood wheels and also a less permanent set than wood wheels. In one test of wire, wood, and steel wheels, the wood wheels were those by two leading American car builders, one making a \$500 car, and the other a \$4,000 machine. The weight of one wood wheel tested including a 16-inch brake drum and demountable rim was 90 pounds, deducting 23 pounds, the weight of the brake drum, leave 67 pounds, the actual weight of the wood wheel as compared with 42 pounds, the weight of the wire wheel, the wood one being 67.5 per cent heavier. These wheels took  $34 \times \frac{1}{2}$  inch tires.

In these tests the load was applied in different ways, in the first series of tests the wheel was off the car and held horizontally, with hub stationary, and the load applied at the rim; in the second the wheel was horizontal, the rim was supported and the load applied on the hub; and in the third a vertical load was applied to the hub and the rim supported by a 6-inch arc of contact, the wheel being vertical.

Fig. 1 shows the first test in which the wheel W is supported horizontally on the hub and downward pull exerted on the rim at the point A. By turning the screw S, so as to raise the lever L, the point A is lowered, bringing pressure on the wheel rim. Using this test of the wire wheel with 500 pounds downward pull, the wheel deflected .020 inch; at 4,000 pounds downward pull the deflection was .2 inch or about  $13\frac{1}{64}$  of an inch. The permanent set was .035 inch. At 8,000 pounds downward pull the permanent set was less than  $3\frac{1}{32}$  inch. At 9,000 pounds downward pull four spokes snapped,

*Editor's Note—Extracts from paper presented by George W. Houk, president of the Houk Mfg. Co., Buffalo, N. Y., presented at the annual meeting of the Society of Automobile Engineers, New York, January 6 and 7.*

and the permanent set was less than  $3\frac{1}{16}$  of an inch. No other damage occurred.

When the wood wheel was similarly tested, the permanent set at 4,000 pounds was .123 inch; at 5,000 pounds it was .203 inch. Between 8,500 and 9,000 pounds the spokes commenced to loosen and pull away from the hub, the permanent set was .363 inch.

Another wood wheel  $34 \times \frac{1}{2}$  with demountable rim and weighing 65 pounds, but without brake drum, being a front wheel, was tested. With a load of 2,500 pounds on the rim the permanent set was .183 inch; at 4,000 pounds it was .625; at 5,000 pounds 1.413. After 5,000 pounds the spokes began to loosen at the hub and at 5,600 pounds one of the spokes cracked near the hub and the permanent set was 2.366 inches.

In a similar test of a wire wheel with a plain puncture rim, 34 by 4 size with a 4,000-pound load at the rim, the permanent set was .029 inch; at 8,000 pounds it was .132 inch; at 8,200 pounds one spoke broke and the permanent set was about  $7\frac{1}{32}$  inch.

In another form of test the wheel was supported horizontally at the rim and the load applied at the hub. With a 30 by 3-inch clincher wire wheel weighing 16 pounds the deflection of 10,500 pounds was .455 inch and the permanent set  $\frac{1}{8}$  inch. The same test on a 30 by 3 plain clincher wood wheel weighing 20 pounds the load was increased to 3,600 pounds when the wheel was declared unfit for service and when the load was increased to 4,600 pounds the wheel collapsed entirely.

With regard to tire wear on wire and wood wheels 3 years' experience with consumers warrants a claim of 30 per cent greater mileage on wire wheels. The radiating surface offered by the wire spokes and the small weight of the rim of the wheel are factors in this greater tire mileage.

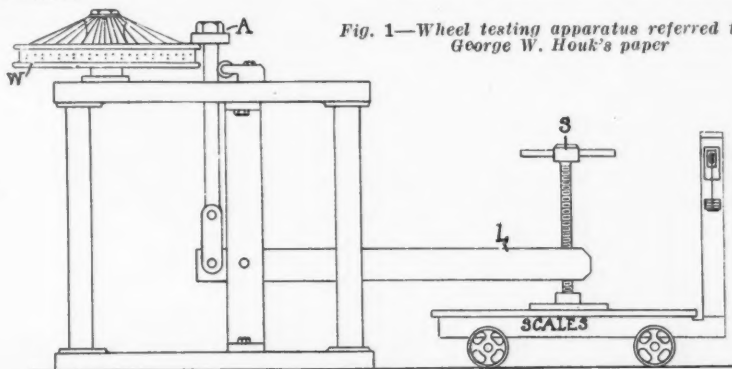


Fig. 1—Wheel testing apparatus referred to in George W. Houk's paper



# Electric Lighting, Cranking and Ignition Systems

## Standard Types and How They Operate

### Part I—First Principles and Present Trends

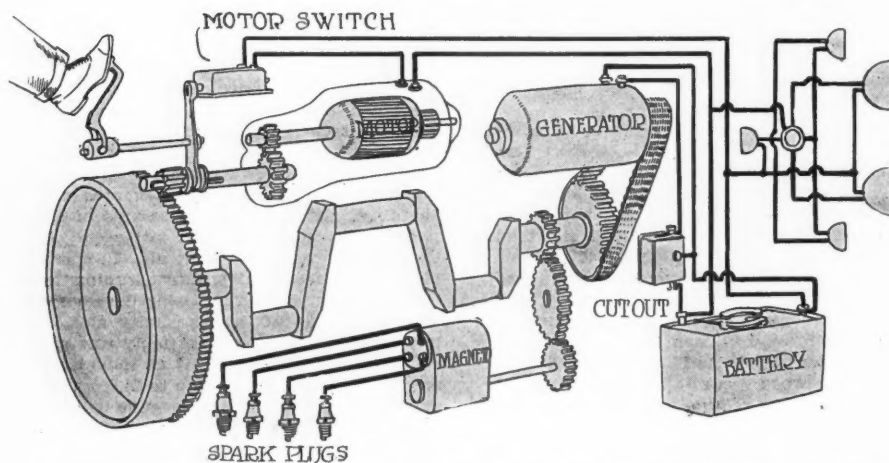


Fig. 1—Typical arrangement of three-unit system of cranking, lighting and ignition. This shows mechanical and electrical connections of the separate units, the cranking motor, lighting generator and ignition magneto

**E**LECTRIC lighting, cranking and ignition systems for motor cars are such a recent development in the field of accessories or parts that numerous changes are to be expected from year to year. The preceding 12 months have witnessed fewer alterations in design than have previous seasons, because manufacturers of these equipments have determined pretty thoroughly the arrangements and constructions that meet with the needs of their patrons.

There have been, however, numerous rearrangements among the manufacturers, mostly in the form of combinations of interests. This means that manufacturing and sales in the industry is reaching a firm basis. The efficiency and added capital obtained through such consolidations makes for still greater stability.

#### Magneto Makers in Field

A feature of note in this rearrangement of manufacturers is the entrance of two of the large magneto makers into the field of electric cranking equipment. Within the past year the Bosch Magneto Co. has absorbed the Rushmore interests and in addition has brought out its own design of equipment, marketing the former as Bosch-Rushmore and the latter as Bosch equipment. Likewise, the Splitdorf Electrical Co. is marketing the output of the Apple Electric Co. as the Splitdorf-Apelco starting and lighting system. The Remy starting and lighting system. The Simms Magneto Co. is building a system styled the Simms-Huff. The Remy Electric Co. has been in the field for some time. Dyneto systems, formerly known as Dyneto-Entz, and made by the Dyneto Electric Co., are developments of the original Entz systems.

Improvements in design and details are numerous, but in few cases are they radical changes from former practice. There has been considerable effort shown in the

#### By Darwin S. Hatch

new designs toward greater accessibility and simplicity. Gray & Davis, for instance, is using rectangular-shaped frames instead of the cylindrical type. Among other advantages gained by the change are increased accessibility and compactness and somewhat greater current efficiency.

Simplicity also is obtained in the Gray & Davis system by a new method of mounting the regulator cutout and switch. The regulation likewise has been simplified in the North East system. One of the features toward which designers are working is greater compactness and less weight of the units. Westinghouse has reduced the weight slightly, as has Delco, and the Splitdorf-Apelco system is somewhat lighter than the former Apelco units. Wagner systems are 50 per cent lighter, it is said, and Gray & Davis have lightened units.

There has been little change in the driving speeds of the generators, most of them being designed to commence charging at 10 or 12 miles per hour. This factor depends somewhat upon the engine to which it is fitted, but the ratio of drive is usually 1 or  $1\frac{1}{2}$  times engine speed. Westinghouse and Dyneto are among the systems in which a slight reduction in the cutting-in speed has been made.

All manufacturers have worked toward betterment in the regulation of the charging current. Delco, for instance, in its later models has changed from the pure inherent regulation to the automatic cutting out of resistance. Motor characteristics have varied little during the past year. The most noticeable change in this regard is in the Wagner, in which, by a change in windings, it has been possible to reduce the weight some 50 per cent, it is stated.

New designs show reduction in the current required for starting, North East and Gray & Davis in particular making a point of this improvement. Gearing the starter motor to the flywheel is becoming more standardized and new models for the new small motors are in evidence.

The electrical equipment of the car ordinarily includes the three functions, ignition, lighting and starting. To consider the field as a whole, all three functions must be taken into consideration, although in many installations the ignition feature either is quite separate or is nearly so, from the other two features.

#### Three Types of Installation

The apparatus by which these three functions are maintained is arranged in different ways and it is upon this arrangement that the first main division occurs and the design of the different units depends upon which of these arrangements is employed. The electrical equipment which performs the ignition, lighting and cranking of the car consists of the following main pieces of apparatus: first for the ignition, there must be a source of electric current, either a storage battery, dry battery, the familiar type of magneto generator, or a generator which is not of the magneto type. In addition, there must be means for transforming the low voltage current into high tension current and other means for distributing the current to the proper spark plug at the proper time.

Second: for the lighting there must be a storage battery which supplies current for the lamps and signalling apparatus, and a generator which supplies current to keep the battery charged.

Third: for cranking there must be an electric motor connected mechanically to the gasoline engine and connected electric-

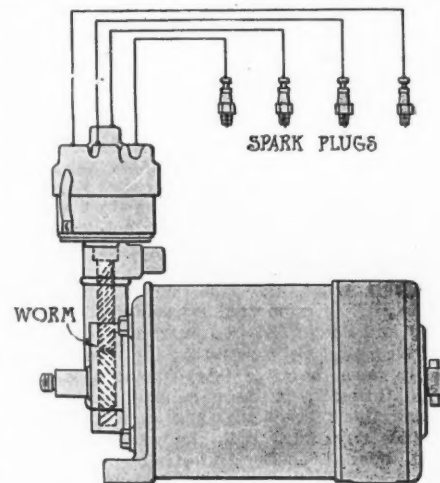


Fig. 2—One unit of a two-unit system. This is a combined lighting and ignition generator, the cranking apparatus being separate. The distributor is driven by a vertical shaft

ally to the storage battery through the proper switches so that current from the battery can be sent into the electric motor, making its armature turn with sufficient force to turn the crankshaft of the engine.

It is evident that each system need not be entirely independent of all the others; that the same storage battery and generator which supply current for the lighting also can be used to supply current for the cranking motor and, in many instances, for the ignition. Also it has been found that other combinations of the various units can be made for the sake of lightness and simplicity.

There are, however, three fundamental units, no matter how they may be combined; the cranking motor, the electric generator, and the ignition device. Upon the way these three units are grounded, the systems may be divided into three classes—three-unit systems, two-unit systems and single unit systems.

### Three-Unit Systems

To the three-unit systems belong those in which the cranking motor, the generator and the ignition device are separate machines, their only interconnections being to the common storage battery, though in some systems of ignition where magneto alone is used, the ignition has no connection at all with the other electric apparatus. Fig. 1 illustrates the three-unit system in which motor, generator and magneto are all distinct. The illustration shows also how the units receive power from or deliver power to the crankshaft of the engine.

Two-unit systems are those in which any two of the three functions are taken care of by one instrument, leaving the other unit to care for the third function. The generator which supplies current to the battery may be fitted with an induction coil, contact breaker and distributor, so that it performs all the functions of the ignition magneto and at the same time charges the battery. This leaves the cranking to be taken care of by a separate

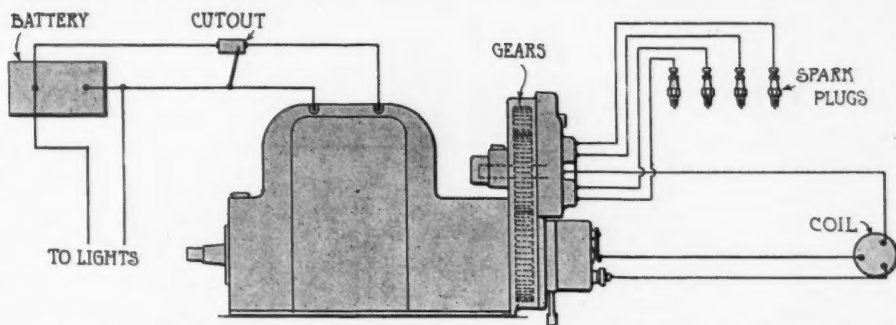


Fig. 3—A two-unit system similar to Fig. 2, except that the ignition distributor is on a horizontal shaft. This also shows the electrical connections

motor. Fig. 2 shows how the combination generator-ignitor is used—the starting motor, being entirely separate, is not shown. Fig. 3 illustrates another design of this combination.

In another type of the two-unit systems, the cranking motor is combined with the generator, with the ignition as a separate installation. This combination of motor and generator may be one of several types. Instead of having two separate instruments they may be combined in the same frame but each have a distinct field and armature of its own. Inasmuch as the generator is not working when the motor is in operation the two armatures may be on the same shaft, one behind the other. This is called the tandem arrangement. Or the generator and motor may be placed one above the other, in a style very aptly termed the "double-deck arrangement." This is illustrated in Fig. 4.

A third method by which the motor and generator are combined is by having two separate windings on the armature of the same machine, one winding being the generator winding and the other the motor winding. The instrument often is called a motor-generator. The same field is used for both but there are two commutators and two sets of brushes. When it is operating as a generator the machine is driven by the engine, usually through the timing gears. When operating as a motor it

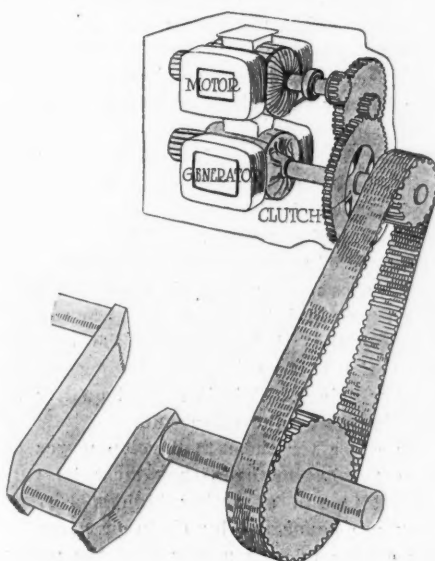
usually drives either through a geared flywheel or by silent chain to the crankshaft. Fig. 5 shows such an arrangement, showing the sliding pinion which meshes with teeth cut on the flywheel when cranking.

Single-unit, or unit systems are those in which cranking, lighting and ignition are all cared for by the same instrument. This consists of a motor-generator like that just described, but which has in connection with its generator portion fitted with induction coil, contact breaker and distributor. A complete system of this sort is illustrated in Fig. 6.

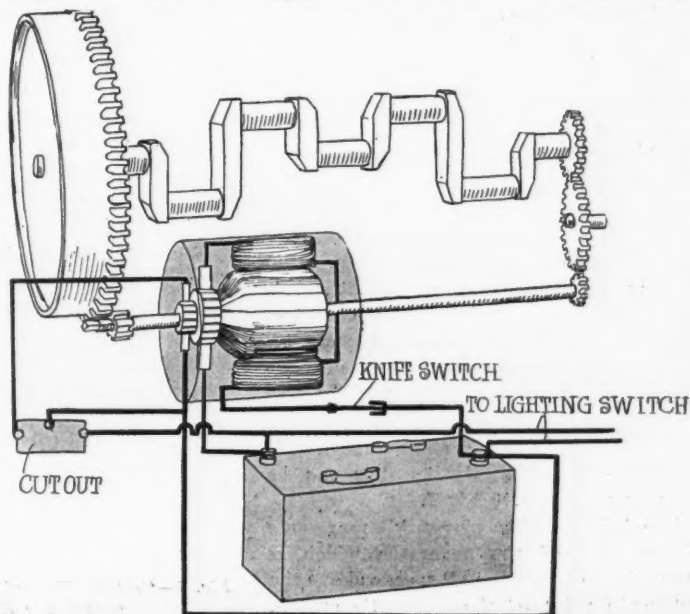
In connecting the generator portion of the electric system to the gasoline engine, either gears or chains must be used. A popular method is to put a separate sprocket on the camshaft and drive the generator directly by a chain from this sprocket. In other installations, the drive is by a gear from the timing gears of the engine.

### Method of Regulation

There is one difficulty in the design of the electric generator that makes special provisions necessary. This is the fact that in simple generators, the faster the armature rotates, the higher the voltage generated and the greater the current sent into the battery. A generator that begins to generate at 500 r. p. m. 4 amperes may give 8 amperes at 650 r. p. m. and, say 12 amperes at 800 r. p. m. But if the storage



Figs. 4 and 5—Two types of two-unit apparatus. This is the combined lighting generator and cranking motor, ignition being separate and not shown. At the left, the two instruments are separate, but combined in the same housing; at the right, the same unit is used, there being separate armature windings. The double-deck arrangement in Fig. 4 is a Remy design





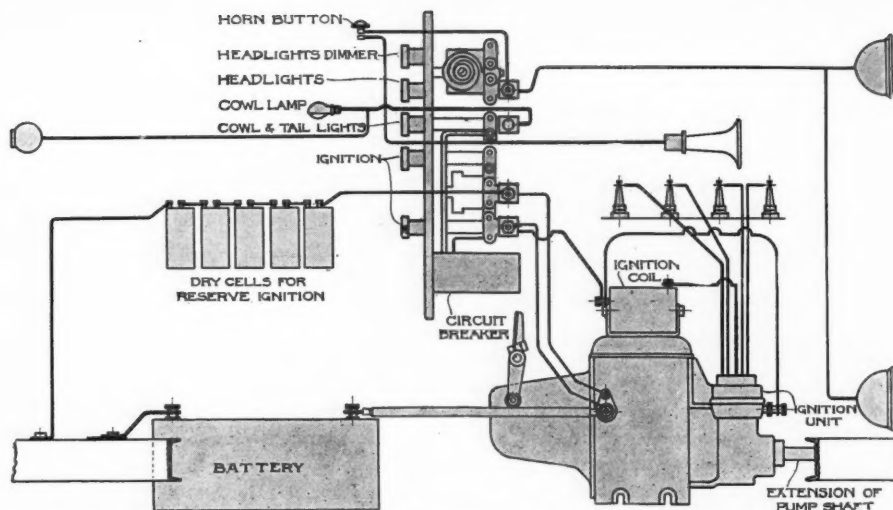


Fig. 6—Typical single-unit or one-unit system. This is a Delco outfit, in which cranking, lighting and ignition are all provided by the one instrument

battery is designed for a maximum charging rate of 10 amperes, there must be some way of limiting the output of the generator.

There are three ways of keeping the generator from overcharging the battery; one is by controlling the speed of the generator armature so that it cannot rotate above a certain safe speed, no matter how fast the engine crankshaft rotates. This is accomplished by means of a governor and slipping clutch, so arranged that when the safe speed is passed the governor releases the clutch. This governor may be either a mechanical one, of the flyball type or centrifugal type, or it may be electromagnetic—that is, arranged to declutch when the current from the generator magnetizes a magnet enough to pull out the clutch.

Another method of regulation is to control the amount of current going to the battery without attempting to regulate the generator output. This is done by an electromagnet which permits current to flow in to the battery only so long as it is of the proper strength. The same result is accomplished by eating up the excess current in resistance.

#### Inherent Regulation

Inherent regulation is the other means; this is accomplished in the design of the generator itself. In this there are two field windings which oppose one another more and more as the speed increases, so that no matter how fast the armature may rotate the current produced never exceeds a safe maximum. Some of the generators are arranged to give a current whose strength depends on the state of charge of the battery. That is, as the battery becomes more fully charged, the current from the generator decreases. This is believed to result in longer life for the battery.

The meaning of taper charge and how it is obtained in the Bijur system can be seen by reference to Fig. 7.

The height of the arrow AB represents the voltage of the generator which is maintained constant at all speeds above the cutting-in point of the automatic switch.

The voltage of a storage battery depends primarily upon its state of charge and with a discharged battery, this voltage is a minimum. The height of the arrow CD represents the voltage of a partially discharged battery. Under these conditions, the difference in pressure between the battery and the generator is represented by AO. This difference in pressure is available for sending a charging current to the battery. In the case of a discharged battery this difference is great enough to produce a large charging current.

As charge continues the voltage of the battery gradually increases and the difference in generator and battery pressure diminishes correspondingly. The result is that the charging current is tapered off to a small value.

#### Shunt-Wound Generators

The common type of generator for motor cars are what is known as shunt-wound. That is, the main current goes directly to the battery, but the field windings are in parallel with the battery. There are two leads from each commutator brush, one to the battery and one to the field. The quantity of current shunted to the field magnets is small owing to the high resistance of the coils. The advantage of this method of winding is that the current supplied to the battery and lamps, etc., is fairly constant, no matter how much the resistance of the external circuit may vary, as lamps are turned on or off or the battery becomes more or less charged.

When the engine is not running or is running at low speeds, it is not turning the generator armature over fast enough for

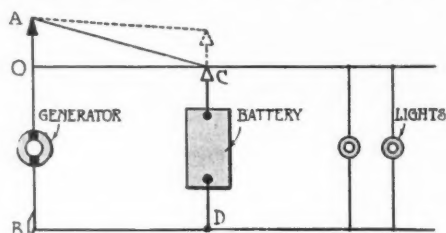


Fig. 7—Graphic illustration of taper charge as obtained in Bijur design

it to produce a very high voltage, so that at low engine speeds the voltage of the generator is less than that of the battery. Consequently, the current will tend to flow from the battery through the generator and the battery thus becomes discharged.

To obviate this difficulty, a device called the cutout is inserted between the generator and battery. It simply is an automatic switch so arranged that it keeps the circuit open between the generator and the storage battery as long as the former is not generating current at a higher voltage than the latter. It often is called a reverse current cutout because it prevents the current from reversing the current from battery to the generator.

There are many forms of electrical cutouts in use but the principle in each is practically the same. Essentially the cutout consists of an iron core wound with two windings, P and S, as shown in Fig. 8, the former being of many turns of fine wire and the latter a few turns of heavy wire. At the end of the core is a piece of metal, V, called an armature, which has a spring attached as shown. The armature may make contact at the point K. When the core is magnetized the armature is attracted in the same way as the vibrator of a coil, and when the core is demagnetized the armature leaves its point of contact.

#### How a Cutout Works

When the gasoline motor is started the electric generator sends current through the cutout and when sufficient speed has been attained and enough current generated to magnetize the iron core, the armature V is attracted as shown in Fig. 9. The current then flows through the points at K to the winding S and then to the battery and to the lamps.

As soon as the motor speed decreases, the generator geared to it turns more slowly and the current output of the generator drops. The battery current will then try to discharge back into the generator. The current from the battery flows back through the cutout and in doing so removes any magnetism present in the core which in turn causes the armature V to be freed. This leaves conditions as at the start with the battery supplying current for the lights.

Starting motors nearly always are series wound, that is, the field coils are in series with the battery instead of being in parallel with the battery as in the case of a shunt-wound generator. The advantage of this type of winding for starting motors is that series motors have the quality of giving a very high turning effort at low speed because the whole force of the current from the battery is going through their field windings. This is a good quality in starting an engine when cold.

In order for them to develop power to turn the engine over they must be permitted to run at rather high speeds, so they are connected by chain or gears to the engine in such a way that the motor shaft may revolve from 3 to 30 times as

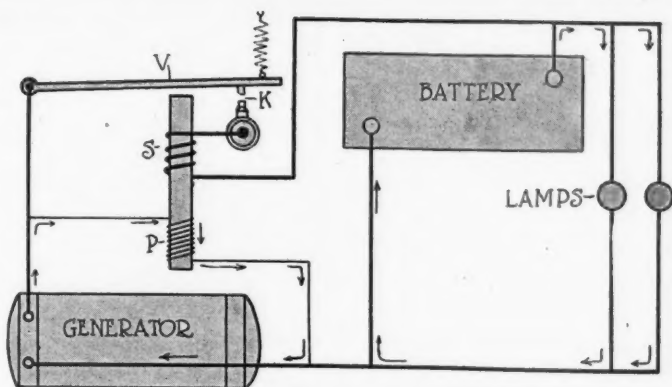


Fig. 8—Operation of a cutout. This shows the circuit opened at K and the path of the current. Generator current going only through winding P of cut-out and lamps being fed by battery

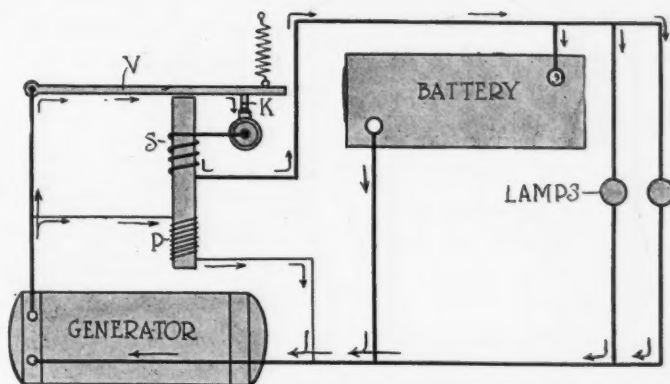


Fig. 9—Operation of a cutout. This shows circuit closed at K and generator charging battery and feeding lamps as shown by the arrows on the diagram

rapidly as the crankshaft of the engine. Usually a first reduction gear of 2 or 3 to 1 is installed in the cover of the motor and a further reduction is often obtained of 8 or 10 to 1 to the crankshaft.

If the starting motor were to be permanently connected to the crankshaft, in most installations, the engine would keep the motor turning so fast that it would burn itself out in a very short time. So an automatic clutch is incorporated with the first gear reduction in the motor case. This is arranged so that as long as the motor is turning the engine crankshaft, the clutch holds, but when the engine runs under its own power, the clutch automatically lets go.

The type of declutching mechanism usually employed is an overrunning clutch and consists of a case with teeth projecting inwards and within it is a star-shaped inner member which is free to turn in the casing. The notches in the inner member form tapered spaces occupied by steel rollers. These are of such size that when the outer member is turned in one direction, they bind between the two surfaces and carry the drive; but if the inner member is turned in the same direction, the rollers move around with it and let the outer casing remain stationary. The outer member is connected to the starting motor and the inner member to the crankshaft.

#### Methods of Installation

Methods of installing and connecting the motor to the engine depend to a great extent upon the space available, but the starter applications may be divided into three classes; by a sliding pinion which meshes with teeth cut in the flywheel rim; by chain or gear to the front end of the crankshaft; by the pumpshaft or magneto shaft through the timing gears. In addition is the method of driving through the transmission gears. The system in vogue a year or so ago, of utilizing the flywheel for the combined motor-generator has but one example in the new cars.

Most popular among the methods of drive at the present is through a sliding pinion and gear-teeth on the flywheel. In this the shifter for the driving pinion is usually connected with the motor switch, so that

the switch is thrown and the gear shifted into mesh with the flywheel in one operation. There is generally a resistance in the starting switch which makes the motor turn slowly at first until the pinion is in mesh and then is cut out and the full current sent to the motor to turn it rapidly.

The operation of the shifter and switch can be understood by reference to Fig. 10, which shows a Westinghouse arrangement. The contact-making part of the switch is shown mounted directly on the gearshift rod, though it can be mounted on any rod inter-connected with the gearshift rod. At A is shown the off position of the shift pinion and switch contactor. Pressure on the starting lever moves the shift rod first to the position B, closing the motor cir-

cuit at P and P1 through the resistance R; this starts the motor at a low speed. Further motion of the shift rod to position C opens the electric circuit; the motor and pinion continue to turn, owing to their momentum. When position C is reached, the pinion is still turning slowly so that it cannot fail to mesh with the gear, but as power is turned off of the motor there is no difficulty in sliding the teeth into full engagement. As soon as the teeth do engage, the pressure on the starting lever shifts the rod to position D, closing the electric circuit at Q after the pinion and gear have meshed a sufficient distance to present a good bearing length on the teeth; this connects the motor directly on the storage battery so that full power is developed, and it turns the engine over until the starting lever is released. When the pressure is removed from the starting lever a spring returns the shifting rod and all parts to position A; this releases the gears and opens the electric circuit, and the motor comes to rest.

Double-deck outfits usually are arranged so that the drive is taken through the armature shaft of the generator, with a train of reduction gearing between motor shaft and generator shaft as in Fig. 4.

In the matter of voltages, 6-volt systems throughout are adopted in many instances. In these a 6-volt battery is used and the generator is arranged to supply both battery and lights at this pressure. Also the battery supplies the cranking motor with 6-volt current. In other instances, a 12-volt system throughout is used. This may supply either 12-volt or 6-volt lamps. Six-volt lamps may be used with a 12-volt supply by connecting in series of two each so that each lamp in a pair takes 6 volts. In still other systems, cranking is by 12-volt current while the lighting current from the battery is at a pressure of 6 volts. This is worked by using a 12-volt battery and splitting it so that only 6 volts is impressed on the lamps.

In an early issue Motor Age will describe in detail each of the various systems as applied to 1915 cars. The path of the current in these different systems also will be traced.

(To be continued)

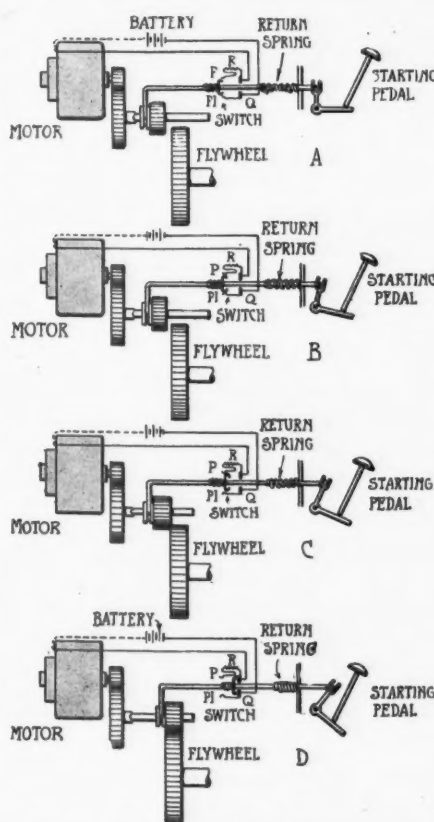


Fig. 10—Typical operation of starting a motor, showing action of starting switch, which turns pinion slowly before gears are meshed—a Westinghouse design





# The Readers' Clearing House



## BOOSTS COLORADO'S GOOD ROADS Says J. P. Harling Is Wrong in Stating U. S. Highways Poor

DENVER, Colo.—Editor Motor Age—Recently it seems to be the tendency of everybody to utter strenuous objections to the bad roads in the United States. The last one comes from the pen of J. P. Harling, of St. Paul, Minn., published in Motor Age December 17. It seems to be the complaint of Mr. Harling that he can not see the beauties of the United States, as shown in Motor Age department, "See America First, See America Now," because of the "poor roads, poor hotel accommodations and mosquitoes a-plenty."

I would like to extend a special invitation to Mr. Harling and anybody else who feels the same as Mr. Harling feels, to visit Colorado during 1915, where he will find good roads, good hotel accommodations and practically no mosquitoes.

I would like to ask Mr. Harling how he would like to visit the highest incorporated city in the world via motor car over good roads, stop at good hotels and not scratch mosquito bites. This can be done in Colorado. On the same trip Mr. Harling could have the pleasure of seeing two of the most beautiful lakes situated nearly 10,000 feet above the sea level and at the foot of splendid mountains towering 4,000 feet higher than the lakes. This can be done with good roads, good hotel accommodations and without mosquitoes.

I also would like to ask Mr. Harling how he would like to see a gorge in the mountains through which a 30-foot river runs; where the sides are so straight up that a stone can be thrown from the top of the rocks on one side to the top on the other side, and these rocks go  $\frac{1}{2}$  mile straight up from the river. I would like to ask Mr. Harling how he would like to view this from the top, having driven the whole distance in a motor car over good roads, with good hotel accommodations and without mosquitoes. It can be done in Colorado.

I also would like to ask Mr. Harling how he would like to view some of the early west, such as was known in this country during the pioneer days; how he would like to see probably the greatest riding, bronchobusting, rope-throwing, steer-tying and other sports known to the cowboys of the early days, and go the whole distance over good roads, with good hotel accommodations and without mosquitoes. This can be done in Cheyenne, which is just 20 miles out of Colorado.

Now, I would like to ask Mr. Harling how he would like to spend a week or 10 days in what has been pronounced the most beautiful mountain park in the world;

where he can drive by car at an elevation of from 5,000 to 11,000 or 12,000 feet; where he can climb around the edge of mountains, where he can run up beautiful canons; where he can do trout fishing all summer long with the assurance that there are fish in the river; where every drink of water he takes is more bracing than stimulants; where every meal he eats gives pleasure and one that will be thoroughly enjoyed; where every direction in which he may look he will find a view of mountain scenery, on which he would be willing to take oath, cannot be duplicated anywhere else in the world; where he can climb mountains until he stands virtually on the top of the world; where he can see glaciers the year round; where he can get into a snow storm in the middle of the summer; where he will encounter mountain sheep, bear and deer in their natural haunts. I would like to ask Mr. Harling if he would like to see this, over good roads, with good hotel accommodations, and without mosquitoes. It can be done in Colorado.

And I would like to ask Mr. Harling if he would appreciate driving with his car through beautiful mountain scenery, dodging in and out of pine groves, having a view, practically all the time, of the backbone of the United States and at the end of a short journey, be able to take a plunge in a pool fed constantly by natural hot water as it comes up out of the ground, water so hot that it must be cooled before you are allowed to bathe in it; water pronounced to have the finest curative properties and effecting more radiol activity than any other water in the world, and to do it all via motor car over good roads with good hotel accommodations and without mosquitoes.

Perhaps it would also interest Mr. Harling to drive a few miles further and climb to the very crest of the continent, where the snows melting on the top of the pass, run both ways, part of the water going into the Gulf of Mexico and part going into the Gulf of California. This can also be done in Colorado, over good roads, with good hotel accommodations, and without mosquitoes.

I want to again offer an invitation to Mr. Harling to visit Colorado in 1915 and to augment this invitation I will guarantee to furnish him with all of the data in reference to the roads, hotels and mosquitoes for any trip he may care to make in the state and furthermore, I also will guarantee to act as a personal guide to his party on some of these trips myself. It is impossible for us to be gone on all of them, but if Mr. Harling is afraid of any of these trips I would be glad to secure for him a guide or driver for his car. Furthermore, I want to assure Mr. Harling or anybody

else who contemplates such a trip that the same can be made with perfect safety during the greater part of the year. In fact, I believe it would be safe to make this trip as many months in the year as it is safe to venture 100 miles out of St. Paul via motor car.

I would be glad to furnish anybody who reads this article further data with reference to Colorado and can furnish pictures in case they do not believe what I am saying. All of these trips I have made myself within the past year in addition to 2,000 miles more of mountain touring in Colorado over good roads, with good hotel accommodations, and without mosquitoes.

And I further want to say that regardless of what make of car Mr. Harling may be driving, I believe this trip can be successfully negotiated, because all cars in Colorado make these trips. I would be glad to hear further from Mr. Harling.—W. J. Haughey.

## ADVANTAGES OF OVERHEAD VALVES Disadvantages Also Given—Power and Speed Two Features

Crookston, Wis.—Editor Motor Age—Kindly give the bore and stroke of the Buick model 40, 1913 car.

2—What is the horsepower of the S. A. E. rating, and how may the S. A. E. rating be found?

3—What is the rear axle gear ratio of this car?

4—What are the advantages and disadvantages of the valve-in-the-head motor?

5—What is the highest speed a Buick 40 can attain equipped with a Stromberg carburetor and Bosch magneto?

6—How far apart should the spark plug points be, using a Bosch high-tension magneto?

7—What may be the causes of the brakes not being effective, and how may it be remedied?—O. J. Vaule.

1—The 1914 model 40 Buick has a  $4\frac{1}{4}$  by  $5\frac{1}{2}$  motor.

2—Its S. A. E. rating is 28.9 horsepower. This is obtained from the formula:

$$D^2N \div 2.5.$$

Where  $D^2$  is the square of the bore in inches or  $4\frac{1}{4}$  times  $4\frac{1}{4}$  or 18.06, and

$N$  is the number of cylinders or four.

Substituting in the formula, we have:

18.06 times 4 equals 72.16, and this, divided by 2.5, equals 28.86, or approximately 28.9 horsepower.

3—The rear axle ratio is 3.75 by 1.

4—The chief advantage claimed for the valve-in-the-head motor is that, for a given size, it has more power than an L-head or T-head, because of the fact larger valves may be used and the combustion chamber given a more spherical shape.

There are a number of manufacturing advantages one of which is that the entire combustion chamber may be machined and given a high polish, thus preventing, to a great extent, the accumulation of carbon.

The loss of heat through the cylinder walls of a motor depends, to a great extent, upon the surface of the walls and in a properly-designed valve-in-the-head mo-

tor this wall area is small, compared with that of another type of motor of the same size. This reduction of wall area is obtained because of the absence of valve pockets.

The main disadvantage of the valve-in-the-head motor, especially one using valve cages, is that the valve seats cannot be cooled as effectively as if the seat were a part of the casting. This is true in the cage construction, because the heat, in order to get from the valve seat to the water jacket, must overcome the resistance of the joint between the cage and the cylinder casting. This lack of cooling would not materially affect the inlet valves, as they are kept comparatively cool by the incoming gas, but it would mean more valve grinding in the case of the exhaust valves.

In many cage-type motors, the cages must be watched to see that they do not turn around and thus cut off the inlet or exhaust, but this usually is caused by negligence on the part of the owner.

5—The car is capable of traveling over 50 miles per hour.

6—The usual point clearance is 1/32 inch, but many find that even a smaller clearance is better.

7—The common cause of brake slippage is due to oil on the brake bands. This oil makes its way from the differential housing to the brake bands and causes the brake drum to slip. Poor adjustment of the brake rods will cause poor performance. Take a squirt gun, fill it with kerosene and empty the contents upon the brake bands. This will tend to dissolve any grease or oil upon them. Motor Age suggests that you have the brakes examined by the nearest Buick agent, for it may be that the oil washers in the rear axle ends are leaky or that the brake bands are worn excessively.

#### MAGNETO WON'T CHARGE BATTERY Only Direct Current for This Work—Some Lighting Questions

Prairie View, Ill.—Editor Motor Age—I have a Splitdorf Model D Type E, and a Heinze Model 16 Type A. M. low-tension magnetos which I have no use for and would like to use them for lighting purposes, one for a motor car and one for my home, using the one with a 6-volt 40-ampere-hour battery on the motor car and the other a 6-volt 120-ampere-hour storage battery for the house, using the magnetos for generators to keep the batteries charged. I have tried both magnetos on a flywheel of a stationary engine with 3-inch pulley and they give at medium engine speeds 12 volts, which is more than I want for charging the batteries. Kindly give instructions and wiring illustrations on how to wire from the magneto to the battery to get the battery charged.

#### Questions Answered and Communications Received

W. J. Haughey.....Denver, Colo.  
O. J. Vaule.....Crookston, Wis.  
A Reader.....Prairie View, Ill.  
A Subscriber.....Shelby, N. C.  
O. H. Weiss.....Hamilton, O.  
A Reader.....Santa Ana, Cal.  
Missouri.....Kennett, Mo.  
O. P. Nolsom.....South Bend, Ind.  
G. E. Tackett.....Colome, S. Dak.

No communications not signed by the reader's full name and address will be answered.

2—Can lights be on at the same time the batteries are charged?

3—How long will two 6-volt 18-candlepower lamps give light with a 6-40 battery?

4—How long and at what volt should a 6-40 battery be charged?

5—How long and at what volt should a 6-120 battery be charged?—A Reader.

1—You cannot use the magnetos for battery charging because the instruments generate an alternating current and only direct current can be used for charging. Even if a rectifier is installed, to change the alternating to direct current, you will not get good results, because the current output of the magnetos is not high enough.

2—In a properly constructed lighting system the lights may be kept burning while the batteries are being charged.

3—The average 6-volt, 18-candlepower lamp consumes about 3 amperes and two of these lamps in parallel will burn for about 7 hours continuously.

4 and 5—This will depend to a large extent upon the make of battery you have. One make of 6-40 requires a 5-volt initial charge and a 2-volt final and for a 6-120 an 18-volt initial charge and 6-volt final. The length of time is a variable, depending upon the condition of the battery.

#### PREVENTING A RADIATOR LEAK Corn Meal Gives Temporary Relief— Special Compounds

Shelby, N. C.—Editor Motor Age—I failed to thoroughly drain the radiator of my car and let it freeze, a leaky radiator being the result. When the water is cold it does not leak, but when the water gets warm the radiator leaks. Does Motor Age know of anything that can be mixed with the water that will stop the leaks?

2—Kindly explain the construction and difference between the Silvertown cord tires and the ordinary tires.

3—I have heard that kerosene would cause the the cylinders to pump oil. What is meant by this?

4—Does the use of kerosene to clean and remove carbon damage the motor in any way?

5—What advantage is gained by the use of glycerine in an anti-freeze solution?

6—Is either wood or denatured alcohol harmful to the radiator?—A Subscriber.

1—Temporary relief will be obtained by using corn meal. A handful or more is dropped into the radiator, the substance collecting around the hole, thus plugging it. There are a number of radiator compounds on the market which may be of value.

2—Ordinary tires use a fabric carcass or one made of a tough grade of duck or canvas. Silvertown cord tires have a cord carcass.

3—Motor Age does not know.

4—No.

5—It prevents the alcohol from evaporating rapidly.

6—No.

#### TIMING IGNITION DISTRIBUTER How Work Is Done on Delco Cranking, Lighting and Ignition System

Hamilton, O.—Editor Motor Age—How are the four and six-cylinder distributors timed in the Delco system?—O. H. Weiss.

Remove the distributor head and rotor and loosen the screw in center of the distributor shaft in order that the timing mechanism be advanced or retarded as necessary.

Turn the engine to dead center with No. 1 cylinder on the firing stroke.

Fully retard the spark lever on the steering wheel sector.

Secure the proper lobe of the distributor cam by turning until the rotor button comes under No. 1 high-tension terminal in the distributor head.

Set this lobe of the cam so that when the back lash in the distributor gears is taken up in a forward direction the timing contacts will be opened and when the back lash is taken up backwards the contacts will just close. The cam must be held in this position and the locating screw in the center of the shaft screwed down firmly in order that this will not slip and throw the ignition out of time.

Replace the rotor and distributor head. The distributor head must be turned so that the locating tongue on the distributor comes in the notch on the distributor head.

#### FITTING TIMKEN ROLLER BEARINGS Cannot Be Used on Ford Car—Installation Possible in 1911 Chalmers

Santa Ana, Cal.—Editor Motor Age—Can Timken roller bearings be used in the rear wheels of a 1911 Chalmers 30 by getting different hubs? If so, what would be the approximate cost? Where can the necessary parts be obtained to make the change?—A Reader.

It might be possible to fit Timken bearings, but the Timken company advises us that definite information cannot be given unless you submit assembly drawing, etc., of the parts at the point of bearing application. Address your communication to the Timken Roller Bearing Co., Canton, O.

Kennett, Mo.—Editor Motor Age—Could Timken bearings be fitted in the front wheels of a Ford car without using new hubs? I thought possibly the spindle could be made smooth, the bearing placed in the hub and babbitt run around it on the outside and inside to hold the roller bearing tightly.

2—Could some form of ball bearing be used in the Ford hub, for instance, Hess Bright, or any other?—Missouri.

1—Timken bearings cannot be installed in the front wheel hubs of the Ford car, as the dimensions of the hub are too small to accommodate even the smallest-size Timken bearing.

2—While it may be possible to use ball bearings in the Ford wheels, in place of the present roller bearings, the reconstruction would be a very difficult matter. The Hess-Bright company does not advise making such a change.

#### Advantages of a Six

South Bend, Ind.—Editor Motor Age—What are the specific advantages of six-cylinder over four-cylinder motors?—O. P. Nolsom.

The advantage of greatest importance is that the six has a more even torque or turning effort than the four because there are three explosions to each revolution against two per revolution in the four. The average six with throttle lower than a four of the same size.

#### Says Starter Pedal Sticks

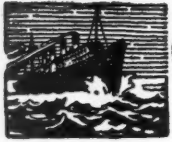
Colome, S. Dak.—Editor Motor Age—Kindly give the reason for the starter pedal sticking and failing to turn the motor over, after the car has stood for a few hours.

2—How can 24-candlepower light bulbs be used instead of 16-candlepower bulbs on a 1915 Buick, model C-25?—G. E. Tackett.

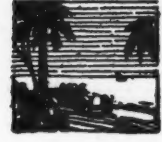
1—A bent pedal rod, lack of oil or a weak battery may be causing the trouble.

2—While you can use 24-candlepower bulbs provided they are of the proper voltage Motor Age does not advise the change, as there may be too great a drain on the battery.





# From the Four Winds



**PLAN to Improve National Road**—Steps are being taken to repair the old National road from Columbus to Hebron, O., in the spring. The Ohio highway department will award the contract some time in March.

**Can't Wash Cars with Gasoline**—Safety Director Holmes, of Cincinnati, O., has given orders prohibiting the use of gasoline in the washing of cars. A number of fires recently have taken place through the use of gasoline in that manner. Director Holmes suggests that coal oil, which is not as volatile as gasoline, be used.

**Cars Increase Like Belgian Hares**—In the 12 months past and the 6 months to come, the number of motor cars operated in Los Angeles county, California, will be doubled. In Los Angeles today there are approximately 28,000 cars, an increase of 7,000, or 25 per cent, in the past year. In the county, outside the city, there are 15,000 more cars—a total of 43,000 machines, and probably more than in any other county in the United States.

**Omaha Club Elects Officers**—A meeting of the Omaha Automobile Club was held recently and officers of the club elected for 1915 are: President, J. E. George; first vice-president, Col. B. W. Jewell; second vice-president, Randall K. Brown; secretary, Sam Burns; treasurer, Gould Dietz, and counsel, P. A. Wells. The club will secure quarters at a prominent location for an information bureau of road news.

**Many Ask for Hoodoo Tag**—Ohio in 1914 had 122,503 motor cars against 86,156 in the year 1913. Application for the 1915 tags are now being made and it is expected that the present year will see more than 150,000 cars in the state. Many applications have been made for tag 13, superstition having been cast aside by several persons. The tag will go to J. W. Jones, of Middleport, who made application for it more than 1 year ago. Tag No. 1 will be given to John L. Vance, a Columbus banker.

**Boone Trail to Be Improved**—Good roads workers and motorists are planning to improve the Boone trail early this spring and with the completion of the work from Crab Orchard to Cumberland Gap motor enthusiasts from all parts of the world will find an irresistible attraction. It is the trail blazed into the "dark and bloody ground" by Daniel Boone, the father of Kentucky. The slogan of the good roads people of southeastern Kentucky, "On to Cumberland Gap," has not only a patriotic but a material appeal, from the fact that with the completion of the long contemplated historic highway all lines of business endeavor will benefit largely.

**Car Crooks Busy in Denver**—The year 1914 has been a record year for motor car stealing in Denver, the total number of thefts being 171. All but five of these have been recovered, however, by the combined efforts of the police department and the Denver Motor Club. More than 150 of these stolen cars have been recovered by the Denver Motor Club's detective, John A. Payment, some of them after they had been driven several hundred miles from Denver. Only ten or twelve of the stolen cars belonged to members of the motor club, and every one of these was recovered. This fact is considered evidence that persons stealing motor cars, whether to make away with them permanently or merely to take a "joy ride," are largely inclined to pass by a car bearing the

club's protective license plate. This protection for its members is regarded as one of the most important benefits furnished by the club.

**Mail Truck Establishes Record**—A Reo truck at Ellensburg, Wash., holds a unique record. This truck carries the mail, parcel post and freight from Brewster to Twisp, Wash., a distance of 70 miles, and always has a capacity load of 2 tons or more, making a round trip of 140 miles a day. The road is very rough and hilly, yet the truck maintains an average speed which brings it to its destination in less elapsed time than a high-powered six-cylinder touring car, which is operated as a stage over the same route. This truck has made 75,000 miles to date on this run.

**Storage for Ten Cents a Day**—Storage at 10 cents per car per day of 8 hours is the rate offered Milwaukee business and professional men with offices in the downtown district by the new Wells Garage Co., which has just opened its new \$40,000 garage at Fourth and Wells streets. Since the city of Milwaukee passed ordinances restricting the use of downtown streets during the day time because of crowded conditions, several downtown garages have catered to daylight storage trade, but none has sufficient room to care for even a small part of those applying for space. The Wells Garage is arranged

to take care of more than 125 cars, and has appliances for quick in or out handling.

**Accepts Bid to Ride; Sues Driver**—Does the acceptance of a ride with a friend in a motor car forfeit the right to collect damages for injuries received, due to the driver's carelessness? This point will be settled at Davenport, Ia., when the case of Edward Plagmann against August Jans comes up. Plagmann filed suit against Jans asking \$15,000. He avers that while the car was going at an excessive rate of speed, it collided with a culvert and turned turtle. Plagmann lost one eye and seventeen teeth, and in addition received a broken nose, broken jaw and several other fractures. He is unable to masticate his food and claims permanent injuries.

**Siberian Governor Orders Franklin**—The first motor car on the Kamchatka peninsula of Siberia is to be an air-cooled Franklin, according to Fred LeRoy Granville, who has just returned from Petropavlovsk. Granville was on board the King and Winge, a whaler chartered by a California motion picture concern for the purpose of rescuing the survivors of the Karluk, Stefansson's ill-fated vessel, who were on Wrangell Island. After turning the rescued men over to the revenue cutter Bear, Granville went back to Siberia, where he became well acquainted with Governor Manamohoff. When the motion picture man left to return to his home in Los Angeles, he carried an order from the Siberian governor for a Franklin car which is to be taken north when the expedition sails for the Arctic regions early in April.

**Many Tax Dodgers in Georgia**—Secretary of State Phillip Cook is authority for the statement that Georgia is out about \$30,000 through motor car owners who have failed to pay their state tax of \$5 for 1914. Mr. Cook says he has reports from all over the state indicating that about 6,000 owners of motor vehicles are dodging the tax. He named Augusta, Savannah, Albany and Americus as the principal cities where motorists have failed to pay this fee. The enforcement of the law, Mr. Cook points out, is up to the county officials, and as a remedy for present conditions he offers the suggestion that the arresting officer be given a percentage of the fine imposed for non-payment of the tax. The fund derived from the tax comes back to the counties for road improvement purposes in proportion to the rural free delivery mileage in the counties.

**New Traffic Code for Omaha**—Omaha is now lining up with the rest of the big cities in the United States in regard to proper traffic laws governing vehicles of all kinds. A new traffic code became effective recently requiring lights on all vehicles, whether motor-drawn or otherwise, and extends the district wherein 12 miles per hour is the maximum speed. An ordinance requiring that the driver of every motor-drawn vehicle, whether he be the owner of a limousine or the chauffeur of a taxicab, to take out a chauffeur's license has also been introduced to the city commission and will soon be passed on. With the license will go one of the metal tags. Any driver who does not display this tag conspicuously upon his coat or other outer garment will be subject to arrest. Ordinances have recently been made in regard to the proper parking of motor cars in the down-town district and it is also a law now that lights must be displayed on the rear as well as the front end of all vehicles.

## Coming Motor Events

### SHOWS AND CONVENTIONS

January 2-9—New York show.  
January 7-9—Show, Pasadena, Cal.  
January 8-14—Show, Milwaukee, Wis.  
January 9-16—Philadelphia show.  
January 16-23—Show, Cleveland, O.  
January 16-23—Show, Detroit, Mich.  
January 18-23—Show, Rochester, N. Y.  
January 20-23—Show, Lancaster, Pa.  
January 23-30—Chicago show.  
January 23-30—Montreal show.  
January 23-30—Show, Portland, Ore.  
January 25-30—Show, Buffalo, N. Y.  
January 25-30—Show, Fall River, Mass.  
January 26-30—Show, Tiffin, O.  
January 30-February 6—Minneapolis show.  
January 30-February 6—Show, Columbus.  
February 1-6—Show, Louisville, Ky.  
February 1-6—Show, Kalamazoo, Mich.  
February 6-13—Show, Hartford, Conn.  
February 8-13—Show, Toledo, O.  
February 9-12—Show, Peoria, Ill.  
February 8-15—Show, Kansas City, Mo.  
February 9-12—Show, Eau Claire, Wis.  
February 15-20—Show, Omaha, Neb.  
February 15-20—Show, Grand Rapids, Mich.  
February 15-20—Show, Tacoma, Wash.  
February 23-27—Show, Ft. Dodge, Ia.  
February 23-27—Show, Syracuse, N. Y.  
February—Show, Rockford, Ill.  
March 6-13—Show, Boston, Mass.  
March 8-13—Show, Des Moines, Ia.

### CONTESTS

January 9—Point Loma road race, San Diego, Cal.  
\* February 22—Vanderbilt cup race, San Francisco, Cal.  
\* February 27—Grand prize road race, San Francisco, Cal.  
March 17—Road race, Venice, Cal.  
\* May 29—500-mile speedway race, Indianapolis, Ind.  
June 9—200-mile race, Galesburg, Ill.  
June 19—Chicago speedway race.  
June 26—300-mile race, Sioux City, Ia.  
August 20-21—Elgin road races.

\* Sanctioned by A. A. A.



# Among the Makers and Dealers



**MILWAUKEE Dealer Passes Away**—Abram H. Esbenshade, for 3 years Milwaukee distributor for the Waverley electric and previously for 30 years president of the Westphal File Co., died December 28, aged 61 years.

**New Vice-President for Overland**—At a recent directors' meeting H. L. Shepler was elected a vice-president of the Willys-Overland Co. Mr. Shepler will continue in charge of production as in the past, to which will be added other duties entailed by his office as vice-president and his membership in the board of directors.

**Bruske to Manage Racing Team**—Paul Bruske, who resigned as manager of the publicity department of the Studebaker Corp. to go with the Maxwell Motor Co., will be manager of the racing team. He has left for California, where he will take charge of the team which is entered in the San Diego and San Francisco meets.

**Peckham Forming New Company**—George G. Peckham, formerly proprietor of the Peckham Motor Car Co., of Dayton, O., who has been in the motor car business in Toledo for several months, has returned to Dayton and is looking for a site upon which to construct a plant. Toledo capital is interested in the project.

**Changes in Velle Staff**—R. R. Bush has been promoted from sales manager to manager of the Velle Motor Vehicle Co. and the Velle Engineering Co. George H. Lloyd has been placed in charge of sales, filling the office made vacant by the advancement of Mr. Bush. H. T. Wheelock has assumed charge of the advertising department in addition to his affiliation with motor truck sales.

**George Sails for Europe**—Claude A. George, who has been made export sales manager of the Signal Motor Truck Co. and of the O. K. Light Delivery Truck Co., both of Detroit, sailed December 26 for London, England, where he will make his headquarters. Mr. George, who for several years was connected with the export department of the Willys-Overland Co., will make a business tour of Europe.

**New Top Maker at Kalamazoo**—The Auto Top and Seat Cover Co. is the name of a new concern located at Kalamazoo, Mich. S. G. Brink is at the head of the concern. He has been associated with the Velle Motor Vehicle Co., Moline, Ill.; Auburn Auto Co., Auburn, Ind.; Eckert Carriage Co., Auburn, Ind.; Page Bros. Buggy Co., Marshall, Mich., and for the last 2 years he has had entire charge of the trimming department of the Michigan Buggy Co. The new concern is located at 214 East Water street.

**Forming Motor Car Holding Company**—L. H. Rose and Paul Smith, with headquarters in San Francisco, are forming a motor car holding company, the name of which has not yet been chosen. The company will be an incorporation with a capital stock of \$50,000, for the purpose of carrying on a general motor car brokerage business. The corporation will act as a holding company for the operation of a chain of retail stores along the entire Pacific coast from Seattle, Wash., to Bakersfield, Cal. The managers of these stores will be stockholders in the corporation, and it will be the purpose of the corporation to bring about a uniformity in the advertising and sales methods of these stores as rapidly as possible. Only popular priced cars will be handled. The plan of this chain of stores also provides for handling

the customer's notes and contemplates financing arrangements to be made by the holding company which will enable the retail stores to lift the drafts and obtain possession of cars shipped from the factory on payment of the freight on same only.

**Enlarging McGraw Tire Plant**—The McGraw Tire and Rubber Co. has awarded a contract for the construction of an additional wing to the plant on Taggart street, East Palestine, O. The addition is necessary to keep up with increased business.

**Peninsular Sale January 7**—The plant and equipment of the bankrupt Peninsular Steel Castings Co., Detroit, Mich., will be offered for sale at public auction at 10 o'clock January 7. The property occupies a plot of ground 371 by 100 feet. The foundry building is 50 by 250 feet and is equipped with machinery, tools and supplies and could be re-operated at once.

**Garage Man Must Pay Damages**—Clare Elwell, of Mendota, Ill., has secured a judgment for \$3,000 against A. W. Schlessinger, proprietor of a garage at Detroit, Mich. Elwell claims that he applied to Schlessinger for the rental of a car to make a trip to North Dakota and was given assurance that he could have the car as long as he required it. After the journey had commenced Schlessinger is alleged to have told an insurance agent, who issued a policy of \$1,000 upon the car, that it had been stolen. The insurance people procured the arrest of El-

well and he was brought back to Detroit. Following a hearing the case was dismissed. Elwell immediately filed suit for damages, alleging false arrest, and a jury awarded him \$3,000. Other charges against Schlessinger may be filed later.

**Build 3,253,835 Tires in 5 Years**—Figures showing the tire production of The Goodyear Tire and Rubber Co. for 5 years recently have been compiled. They show a total production of 3,253,835 tires. In 1909 Goodyear made and sold 102,669 tires; in 1910 the figure was 207,442; in 1911, 332,458 tires were made; in 1913, 1,132,869 was the number, and in 1914 these figures were topped by a production of 1,478,396. This accounts only for the pneumatic tire production.

**Remy Acquires Detroit Location**—The Remy Electric Co., Anderson, Ind., closed a deal last week involving the purchase of a tract on East Grand Boulevard, Detroit, near the Packard Motor Car Co.'s plant, having a frontage of 500 feet on the boulevard and a depth of 150 feet. A building to house the engineering, experimental laboratories and drafting departments, as well as Detroit branch and service station, with about 20,000 feet floor space, three stories high, will be erected at once and will probably be ready for occupancy in 3 months, at which time the departments mentioned above will be moved from the main plant at Anderson, Ind. This move was influenced largely by the demand of Detroit manufacturers for Remy products.

## Recent Incorporations

**Akron, O.**—Main Motor Car Co., capital stock \$25,000; incorporators, T. C. Johnson, A. H. Johnson, F. Sparkes, F. A. Koope, I. K. Lends.

**Albany, N. Y.**—Dals Auto Supply and Accessory Co., capital stock \$25,000; incorporators, B. Schane, A. Schane.

**Albany, N. Y.**—Nonpareil Garage, capital stock \$5,000; incorporators, J. E. Kerr, H. Redelsheimer, S. Goldberg.

**Augusta, Me.**—Monarch Stretched Tire Co., capital stock \$5,000,000; to manufacture tires; incorporators, H. Mitchell, H. A. Paul.

**Austin, Tex.**—Magnolia Motor Sales Co., capital stock \$12,000; incorporators, J. D. Kerr, P. H. Carr, G. E. Gillmore.

**Austin, Tex.**—Motor Bus Co., capital stock \$2,500; incorporators, J. V. Robins, J. J. McCourt, J. W. Kirkpatrick.

**Boston, Mass.**—Auto Air Brake Co., capital stock \$200,000; incorporators, H. I. Lazarus, A. J. Gaulin, A. R. Van Dyke.

**Carrollton, O.**—Monarch Rubber Co., capital stock \$1,000,000; to manufacture tires; incorporators, E. S. Henderson, I. E. Friedler, H. E. Henderson, F. W. McCoy, H. R. Kemerer.

**Columbus, O.**—Kissel Service Co., capital stock \$10,000; to deal in motor cars and accessories; incorporators, C. G. McCune, R. T. Fisher, W. Gathier, J. M. Garard, L. B. Dunning.

**Columbus, O.**—Lohse Automobile Improvement Co., capital stock \$25,000; incorporators, R. Ryder, W. S. Ryder, M. Reitz, R. Lohse, C. Wehrmeyer.

**Columbus, O.**—Ohio Engine Co., capital stock \$25,000; incorporators, C. E. Hogan, K. L. Kelly.

**Detroit, Mich.**—American Motor Sales Co., capital stock \$8,000; to deal in motor cars and accessories; incorporators, J. C. Pennell, H. Dawson, E. E. Sullivan, B. C. Pennell.

**Dover, Del.**—Eagle-Macomber Motor Car Co., capital stock \$1,500,000; incorporators, I. Parker, U. B. Curtis, E. G. Lancaster.

**Grand Rapids, Mich.**—Grand Rapids Saxon Co., capital stock \$5,000; to deal in motor cars and accessories.

**Kansas City, Mo.**—Summers Motor Devices Co., capital stock \$5,000; incorporators, C. E. Summers, W. E. Robbins, C. E. Adams.

**Lawrence, Mass.**—Burnham Motor Co., capital stock \$1,000; incorporators, C. R. Burnham, L. E. Burnham, E. L. Burnham.

**Manitowoc, Wis.**—Dicke Motor Car Co., capital stock \$1,000; incorporators, W. C. Dicke, L. S. Dicke, H. Menzel.

**Middletown, N. Y.**—Lion Sales Co., capital stock \$5,000; incorporators, R. F. Finch, C. M. Breiner, D. A. Heffernan.

**Muskogee, Okla.**—Muskogee Automobile Dealers' Association; incorporators, W. A. Campbell, C. L. Anderson, H. Kitto, H. Waterton, S. J. Miller.

**New Haven, Conn.**—James M. Royce Garage, capital stock \$10,000; incorporators, S. W. Boyce, L. Boyce, Mary C. Boyce.

**New York**—Shaw Pearson Motor Corp., capital stock \$2,000; incorporators, O. F. Shaw, H. E. Meyn, F. A. Hallock.

**New York**—Dals Auto Supply and Accessory Co., capital stock \$25,000; incorporators, B. Schane, A. L. Schane, D. L. Schane.

**New York**—Mecca Mfg. and Specialty Co., capital stock \$1,000; incorporators, G. B. Marshall, E. J. Kern, K. W. Tompkins.

**New York**—West Sixty-seventh Street Garage, Inc., capital stock \$5,000; incorporators, L. Carlin, S. L. Cohen, R. O'Rourke.

**Oshkosh, Wis.**—Universal Motor Co., capital stock \$25,000; incorporators, J. D. Termaat, L. J. Monahan, A. B. Dye.

**Springfield, Mass.**—Moon Motor Sales Co., capital stock \$15,000; incorporators, I. B. Clark, R. S. Chase, S. McI. Brogan.

**Springfield, Mass.**—Tarbell-Watters Co., to deal in motor car supplies and accessories; capital stock \$6,000; incorporators, F. B. Watters, E. N. Tarbell, A. H. Goettling.

**Sapulpa, Okla.**—Sapulpa Gasoline and Oil Co., capital stock \$15,000; incorporators, P. E. Smith, L. E. Smith, P. F. Smith.

**Trenton, N. J.**—Motor Sales Agency of the Oranges, capital stock \$25,000; to deal in motor cars; incorporators, H. F. Hersman, A. T. Muir.

**Toledo, O.**—Portage Motor Sales Co., capital stock \$3,000; incorporators, H. E. Petley, Henry Petley, N. H. Hagelbarger.

**Uxbridge, Mass.**—Uxbridge Auto Co., capital stock \$5,000; incorporators, C. C. Ames, L. G. Farnum, C. L. Richardson.

**Wheeling, W. Va.**—Xylos Rubber Co., capital stock \$50,000; incorporators, G. H. Polhemus, M. S. McGregor, G. Seiler, J. H. Focht, W. E. Davies.

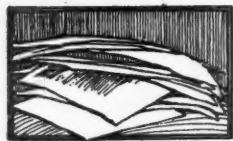
**Wakita, Okla.**—Clinesmith Motor Co., capital stock \$5,000; incorporators, F. L. Clinesmith, John Clinesmith, W. Clinesmith.

**Willoughby, O.**—Standard Fuel Oil Co., capital stock \$50,000; to manufacture engines for motor cars; incorporators, J. E. Morley, C. H. Gale, H. C. Jones, B. A. Kittinger, W. T. Kinder.

**Woodburn, Ky.**—Southeast Automobile Specialty Co., capital stock \$2,000; incorporators, H. O. Kirby, L. J. Kirby, E. Kirby.

**Youngstown, O.**—Motor Sales and Supply Co., capital stock \$10,000; to deal in motor cars and accessories; incorporators, W. V. Burnett, D. L. Rose, A. C. Hendry, D. F. Griffith, R. C. Fuhrman.





# Brief Business Announcements



**FINDLAY, O.**—W. E. Ellis has opened a garage and repair shop at 225 North Main street.

**Shawano, Wis.**—C. E. Dunn, of Shawano, Wis., will establish a tire and vulcanizing shop about April 1.

**Chicago**—The Maxwell Motor Car Co. has opened a new warehouse and parts station at 2024-26 Wabash avenue to serve dealers in Illinois, Iowa and Wisconsin.

**Kansas City, Mo.**—H. B. and W. R. Thorp, who until recently handled the Studebaker cars, have formed the Velle-Thorp Motor Co., with headquarters at 1509 McGee street, to handle the Velle.

**Detroit, Mich.**—F. C. Thompson, formerly assistant chief engineer of the Lozier Motor Co., has been appointed manager of the Detroit branch of the Morse Chain Co., Ithaca, N. Y., which has opened offices in the Dime Savings Bank building.

**New York**—The K. P. Foot Rest Heater Co., which formerly had its headquarters in Boston, Mass., has established its main office and New York distributing station at 250 West Fifty-fourth street.

**Rhineland, Wis.**—The Northwest Oil Co., Superior, Wis., and Duluth, Minn., has decided to establish a branch house and distributing station here to handle the north central territory in Wisconsin and give the Standard and independent oil companies com-

petition. Work will be started at once on the erection of tanks and warehouse. A. F. Podvin is local manager.

**New York**—The J-M Shock Absorber Co. has opened a direct factory branch at 250 West Fifty-fourth street. Edward Knauss, who was formerly Boston distributor for the J-M company, is in charge of the local branch.

**Chippewa Falls, Wis.**—The garage of the Barker Automobile Co. was totally destroyed by fire on the evening of December 26, causing a loss of \$20,000. Eight cars were destroyed and fifteen badly scorched. It is expected that a new garage will be built at once.

**New York**—Lester I. Ris, who for the past year has been a traveling sales representative for the Republic Rubber Co. in New York and Connecticut, has been appointed manager of the New York branch of the Knight Tire and Rubber Co., Canton, O., which has just been opened at 215 West Fifty-first street.

**Racine, Wis.**—The Racine Carriage Co., organized recently at Racine, Wis., with \$25,000 capital to consolidate the vehicle interests of the Richardson-Kennedy Co. and the Racine plant of the Racine-Sattley Co., is organizing one of the largest trimming, repainting and repair shops for motor cars in the state, in connection with its business of

manufacturing carriages. Later it is intended to establish a department for the production of special motor car bodies.

**Indianapolis, Ind.**—With C. C. Matthews as manager, a local sales branch of the Delaware Tire Sales Co. has been opened at 15 West North street, to sell Delaware tires.

**Findlay, O.**—The Hancock Novelty Works, with R. W. Stewart, of Findlay, and J. C. Harper and P. T. Mills, of Rochester, N. Y., as owners, has opened for business. A general line of motor car accessories will be made.

**Louisville, Ky.**—The Kenton Motor Co., of Cincinnati, O., sales representative for the Allen and Lewis, has opened a branch distributing agency in this city at 437 South Second street. Maximilian Sues has been appointed manager.

**Philadelphia, Pa.**—Carlile & Doughty, electrical and mechanical engineers, formerly of 406 South Eighth street, are the newest acquisitions to motor row, now occupying 846 North Broad street. It has secured the agency for the Disco electric starting and lighting system for Ford cars.

**Columbus, O.**—Notices have been sent out for a meeting of the stockholders of the Columbus Automobile Co. to be held January 16 for the purpose of dissolving the corporation and surrendering the charter. The concern is located at 44 West Chestnut street.

## Recent Agencies Appointed by Motor Car Manufacturers

### PASSENGER CARS

| Town                | Agent                      | Make       |
|---------------------|----------------------------|------------|
| Bucyrus, O.         | A. L. Holloway             | Ford       |
| Berlin, Ont.        | L. C. Browne               | Regal      |
| Bennett, Ia.        | Harding & Trotter          | Oldsmobile |
| Chatham, Ont.       | Mr. John M. McCoig         | Ford       |
| Cincinnati, O.      | Pullman Motor Car Co.      | Pullman    |
| Coshocton, O.       | E. F. Conrad               | Oldsmobile |
| Cleveland, O.       | Cleveland Motor Sales Co.  | Hupmobile  |
| Cleveland, O.       | Brandt Motor Car Co.       | Kisselkar  |
| Cleveland, O.       | Lucas & Christianson       | Mitchell   |
| Columbus, O.        | Motor Sales Co.            | Monarch    |
| Columbus, O.        | F. Mayer & Son             | Monarch    |
| Columbus, O.        | Standard Motor Car Co.     | Milburn    |
| Columbus, O.        | Kissel Service Co.         | Kisselkar  |
| Calgary, Alta.      | Diamond Motor Car Co.      | King       |
| Caracas, Venezuela  | Fernando Marquis Co.       | Chandler   |
| Chambersburg, Pa.   | Jacob Cauffman             | Chandler   |
| Deming, N. M.       | Case & McKinley            | Chandler   |
| El Paso, Texas      | The Lone Star Motor Co.    | Chandler   |
| Fairfield, Me.      | Bishop & Doran             | Chandler   |
| Gillett, Wis.       | C. F. Kitzinger            | Buick      |
| Hancock, Wis.       | Jones & Pierce             | Overland   |
| Hamilton, Ont.      | F. G. Morris               | Chandler   |
| Havana, Cuba        | Juan Ulloa                 | Chandler   |
| Hillsboro, O.       | Hillsboro Motor Car Co.    | Maxwell    |
| Indianapolis, Ind.  | W. J. Small                | Monroe     |
| Kalamazoo, Mich.    | W. O. Harlow               | King       |
| Kansas City, Mo.    | I. D. McGrew               | Pullman    |
| London, Ont.        | London Motor Sales Co.     | Oldsmobile |
| London, Ont.        | London Engine Supplies Co. | Franklin   |
| Louisville, Ky.     | Kenton Motors Co.          | Lewis      |
| Louisville, Ky.     | Kenton Motors Co.          | Allen      |
| Mt. Pleasant, Mich. | Standard Garage            | Dodge      |
| Muir, Mich.         | Sykes and Dilley           | Paige      |
| Mildmay, Ont.       | George Kuneman             | Regal      |

### COMMERCIAL CARS

|                     |                          |          |
|---------------------|--------------------------|----------|
| Chillicothe, O.     | Bartley Mallow           | Koehler  |
| Franklin, Ky.       | Franklin Hardware Co.    | Koehler  |
| Greensboro, N. C.   | Greensboro Motor Car Co. | Koehler  |
| Los Angeles, Cal.   | Mack Motor Truck Co.     | Republic |
| Louisville, Ky.     | Yager Motor Car Co.      | Denby    |
| N. Cambridge, Mass. | Henderson Brothers       | Signal   |

| Town                   | Agent                        | Make       |
|------------------------|------------------------------|------------|
| Oklahoma City, Okla.   | Stapleton Motor Sales Co.    | King       |
| Oklahoma City, Okla.   | Fremont Motor Co.            | Saxon      |
| Port Arthur, Ont.      | Central Garage               | Saxon      |
| Port Arthur, Ont.      | D. Boreau                    | Franklin   |
| Petorlea, Ont.         | Mr. Macklem                  | Fisher     |
| Portland, Ore.         | Dulmage Manley Auto Co.      | Chandler   |
| Portland, Me.          | Leighton Derrah & Griffin    | Chandler   |
| Fort Dodge, Ia.        | Hanson & Tyler               | Chandler   |
| Piqua, O.              | Dayton & Troy Automobile Co. | Ford       |
| Portland, Me.          | D. E. McCann                 | Oldsmobile |
| Quebec, Que.           | Le Page Garage Co.           | Moon       |
| Russell, Kan.          | H. A. Fink                   | Chandler   |
| Ritzville, Wash.       | Ritzville Garage             | Chalmers   |
| Regina, Sask.          | Wright & Mitchell            | King       |
| Sault Ste. Marie, Ont. | G. P. Black                  | Regal      |
| St. John, N. B.        | New Brunswick Motor Car Co.  | Oldsmobile |
| San Juan, P. R.        | Captain Kennerley            | Chandler   |
| San Jose, Cal.         | W. J. Benson                 | Chandler   |
| St. Joseph, Mo.        | Leslie Motor Car Co.         | Chandler   |
| Sherbrooke, Que.       | R. A. Webster                | Reo        |
| Sarnia, Ont.           | R. Milligan                  | Oldsmobile |
| Saco, Me.              | H. A. Harris                 | Chandler   |
| Spokane, Wash.         | Western Motors Co.           | Chalmers   |
| Toronto, Ont.          | Croftan Storage Battery Co.  | Oldsmobile |
| Toronto, Ont.          | Dr. Thompson                 | Simplex    |
| Two Rivers, Wis.       | O. Winkelmiller              | Dodge      |
| Toronto, Ont.          | F. A. Harvey                 | Paterson   |
| Topeka, Kan.           | Independence Auto Co.        | Chandler   |
| Vancouver, B. C.       | Hoffmeister Bros.            | Saxon      |
| Vancouver, B. C.       | H. J. Tucker                 | Keeton     |
| Wheeling, W. Va.       | C. L. Mellott & Son          | Buick      |
| Wautoma, Wis.          | Albert Cutts                 | Overland   |
| Waltham, Mass.         | McGregor Garage              | Chandler   |
| Wilton, N. H.          | F. W. Clark                  | Oldsmobile |

|                 |                         |         |
|-----------------|-------------------------|---------|
| Macon, Ga.      | W. E. Cookerly          | Koehler |
| Omaha, Neb.     | W. L. Huffman           | Signal  |
| Pittsburgh, Pa. | Stewart Motor Truck Co. | Signal  |
| Richmond, Va.   | Alsop Motor Co.         | Koehler |
| Spokane, Wash.  | Signal Truck Co.        | Signal  |

# Bosch



## Ignition Advice For You

A good ignition system is a necessary part of every engine. Batteries alone, or as a part of another system, cannot be expected to retain that essential feature of absolute reliability which an ignition system should have.

If your engine is fitted with a good magneto, you obtain your ignition current from a mechanical source, a source that practically has perpetual life, a source that cannot be made inactive by ordinary damage, nor even by forgetfulness. It is not affected by heat or cold, by rain or snow, by continuous or intermittent use.

Ignition is a factor too important to slight. It should be given more than passing consideration or comment. It should be investigated as closely and as carefully as the engine itself, for upon the ignition system the ability of the engine depends. In fact, the whole car, your comfort, your pleasure, everything depends upon the ignition system.

Don't select "any ignition"; don't be misled by such broad terms as "high tension," "jump spark," or "magneto"—insist that you be given a dependable, no-worry system—a Bosch Magneto.

**Be Satisfied** || *No one ignition system is used  
as universally as the  
Bosch Magneto* || **Specify Bosch**

**Bosch Magneto Company**

214 West 46th Street,

Chicago  
Detroit

Over 250  
Service Stations

New York

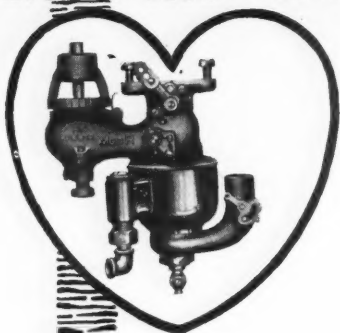
San Francisco  
Toronto



## America's Champion Road Racing Carburetor

# SCHEBLER

*The Heart of the Automobile*



SCHEBLER has won more official road races in the last ten years than any other American carburetor.

The Stutz—first among American road racing cars—winner in the last four years of 28 places out of 36 entries—has been equipped with the SCHEBLER Carburetor in every road race entered.

The National—second only to Stutz in road racing honors and winner of 26 places out of 37 entries—won all its races equipped with the SCHEBLER Carburetor.

The Buick—with the third largest number of road racing victories to its credit—30 places out of 49 entries—was invariably SCHEBLER equipped.

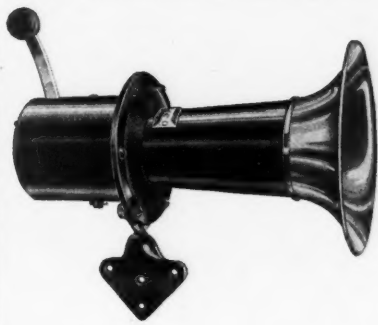
The SCHEBLER Carburetor is maintaining the lead today that it has held consistently throughout the last ten years. On this point it is worth while remembering that first and second places in the recent Los Angeles-Phoenix 696-mile road race went respectively to a SCHEBLER-equipped Stutz and a SCHEBLER-equipped Paige.

Nothing proves the EVERYDAY WORTH of a carburetor—the ability to stand up under most adverse service conditions—more certainly than road racing. SCHEBLER carburetors stand the gaff!

**WHEELER & SCHEBLER**  
INDIANAPOLIS INDIANA



*When Writing to Advertisers, Please Mention Motor Age.*



# SPARTON PRODUCTS



are Now Standard  
Equipment with Over

## 80

Leading Car Manufacturers

We Give the Names of  
a Few of Them

Fifteen years' experience has made  
this product the highest grade of its  
kind.

Our Immense Capacity  
of  
2400 Sparton Horns per Day  
and

2000 Sparton Fans per Day

Assures You of Deliveries When Needed

An inquiry will bring our engineers to  
your factory with our experience to  
solve your problems.

We Are At Your Service

**The Sparks-Withington Co.**  
Jackson, Mich.



Hudson  
Pierce-Arrow

Peerless

Mercer

Velie

Apperson

F. I. A. T.

Pathfinder

Lexington

Lozier

Cunningham

Jackson

Abbott

Enger

Pilot

Lancia

Chandler

White

Locomobile

Marmon

Haynes

Studebaker

Chalmers

Havers

Imperial

Pullman

Austin

Reo

Stanley

Maxwell

National

Kissel





# THE NATIONAL AUTO SHOW



Under Auspices of National Automobile  
Chamber of Commerce, Inc.

At CHICAGO

**Coliseum**

and

**1st Regiment Armory**

January 23—30

***Passenger Vehicles—Parts  
Accessories***

S. A. MILES, *Manager*

Auditorium Hotel, Chicago

The Usual Courtesies to Visiting Dealers

*When Writing to Advertisers, Please Mention Motor Age.*



## Four Miles an Hour (Without a Willard)

One horse-power sometimes beats forty because it's available.

The "forty" is a wonder when it's under way; but it balks at cold weather

**Unless you put a Willard back of it**

The Willard will make any old engine turn over and start warming up.

Of course, that's only one of a whole lot of reasons for that 85%\* and they are all good ones.

# Willard STORAGE BATTERY

**Willard Storage Battery Company**  
Cleveland, Ohio

New York Branch: 228-30 W. 58th St.

Chicago Branch: 2524-30 S. Wabash Ave.

Indianapolis Branch: 318 N. Illinois St.

Detroit Branch: 736-38-40 Woodward Ave.

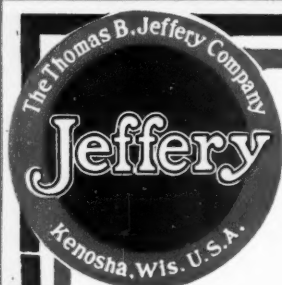
San Francisco Branch: 821 Monadnock Bldg.

*Service Stations in All Principal Cities in the United States, Canada and Mexico*

\* 85% of all makers of electrically equipped cars specify Willard Batteries

*When Writing to Advertisers, Please Mention Motor Age.*





The **Jeffery** Chesterfield Six is not in competition with low-priced cars. It is not in competition with other medium-priced cars. It is in competition with the highest-priced cars in the world.

# The Jeffery Six and

Disregard price and consider that the **Jeffery** Chesterfield Six is equipped with the Bijur Starting and Lighting System in use by the foremost cars of the world;

—that it is the only car in the United States in its price class having a four-speed transmission;

—that its worm drive is a type used exclusively on the finest electrics and finest trucks and the best makes of foreign cars, but, with no important exceptions, on no other American car;

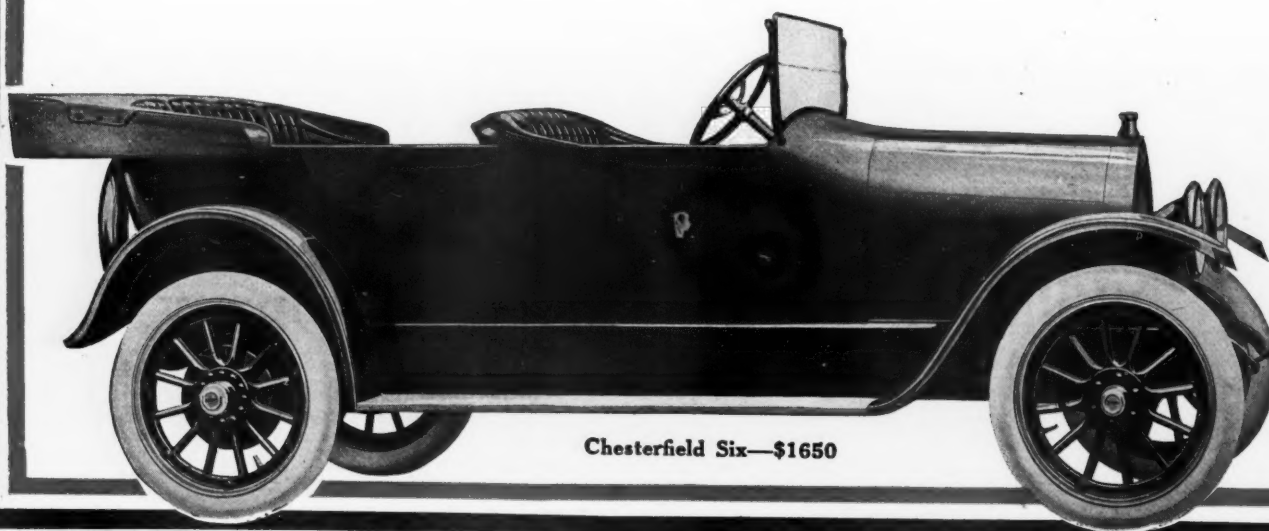
—that its finish—requiring 22 operations—is unsurpassed on any car here or abroad;

—that it has Tungsten steel valves five times costlier than the other kind, 3-plate dry disc clutch, imported annular bearings throughout, Bosch ignition throughout, New Model Stromberg carburetor, Stewart vacuum gasoline feed, Cantilever springs, Daimler leather coupling, Spicer universal joints, Waltham clock, and every refinement in the way of equipment.

Consider that these are actually specifications of cars in the four or five thousand dollar price class, yet obtainable in the medium-priced **Jeffery** Chesterfield Six selling at \$1650.

See the complete line of **Jeffery** Cars at the Shows, New York, Grand Central Palace, Space A31, or at Chicago, Coliseum, Space C3.

**The Thomas B. Jeffery Company**  
Main Office and Works, Kenosha, Wisconsin



Chesterfield Six—\$1650

*When Writing to Advertisers, Please Mention Motor Age.*



Something like a thousand dollars would have to be added to the price of the **Jeffery** Six-48, if this car were made in small quantities and saddled with heavy selling expenses.

# Chesterfield Six-48

The **Jeffery** Six-48 is beyond question the biggest \$2400 worth of thoroughly high grade motor car obtainable on the market today.

It meets the demand of the man who wants a larger car than the Chesterfield Six—a car built to the **Jeffery** Standard of Quality—generous in size, luxurious, comfortable, easy-riding and durable as cars in the four and five thousand dollar class, yet exceedingly economical in operation.

Although a full-grown seven passenger car, it weighs but 3700 pounds and delivers remarkable mileage per gallon of gasoline.

The power plant is a  $3\frac{3}{4}$  by  $5\frac{1}{4}$  high-speed—high-efficiency motor with cylinders cast in pairs.

Due to its 48-H. P. power plant, it is as "quick on its feet" as the smaller **Jeffery** models. An ideal car for both city driving and long touring purposes.

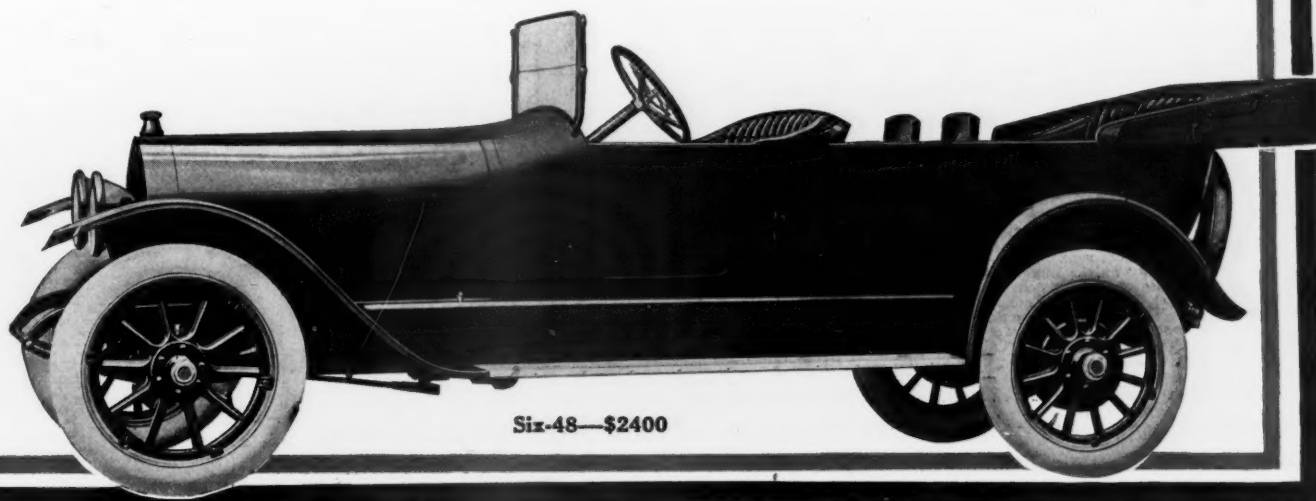
The wheel base of this car is  $133\frac{1}{2}$  inches, and the tires are 36 by  $4\frac{1}{2}$ , on demountable rims.

Finest materials are used as in other **Jeffery** models and the equipment is complete in every detail.

All prices f. o. b. Kenosha.

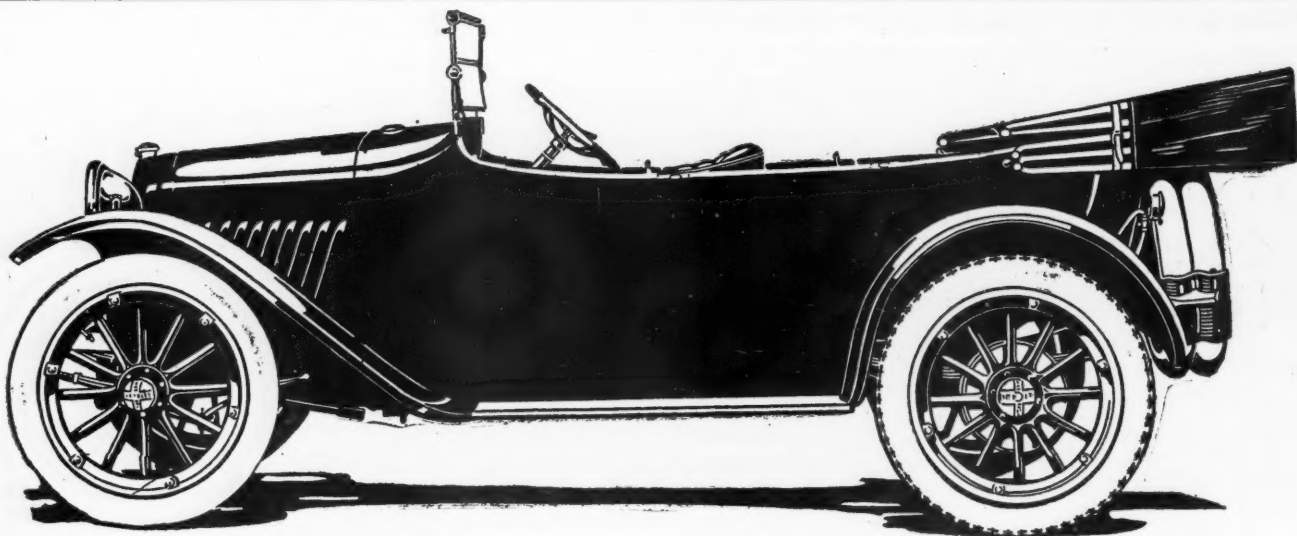
**DEALERS: Jeffery** Cars at their price offer the greatest opportunity in the field. See us at the Shows or write direct for detailed information.

**The Thomas B. Jeffery Company**  
Main Office and Works, Kenosha, Wisconsin



Six-48—\$2400





# Detroit "Eight"

**\$1295**

## SPECIFICATIONS

**POWER PLANT**—Unit type, completely enclosed. Three-point suspension.

**MOTOR**—Eight cylinders, in two enbloc L head sets. Bore 2 3/4", stroke 4 1/2". Develops 34 h.p. at 1800 r.p.m. Aluminum crank case, removable fly-wheel housing. Two bearing, drop forged crank-shaft, front bearing 1 1/2"x2 3/32"; rear, 1 3/4"x4 1/4". Drop forged connecting rods, two rods to each throw, one yoked, the other between yoke arms. Single drop forged camshaft with integral cams, directly above crankshaft, each cam operating two opposite valves. Oil pump. Double jet type carburetor set between cylinders. Two-unit starting, lighting and ignition system, with distribution coil and storage battery; silent chain drive. Inertia pinion drive for starter.

**COOLING**—Pump system, tubular type radiator of extra capacity.

**FUEL SUPPLY**—Gravity feed, tank in cowl.

**CLUTCH**—Multiple disc running in oil.

**TRANSMISSION**—Selective type, sliding gears; three speeds forward and reverse.

**DRIVE**—Left-side.

**CONTROL**—Gear shifting lever and emergency brake in center of car.

**FRONT AXLE**—"I" beam, drop forging.

**REAR AXLE**—Full-floating.

**BRAKES**—Double internal expanding; one 14-inch drum and one 10-inch drum on each rear wheel encased.

**WHEELBASE**—112 inches.

**FRAME**—Pressed steel channel section, drop type, permitting low-hung car.

**CLEARANCE**—10 1/4 inches.

**SPRINGS**—Semi-elliptic in front, 37 inches long; platform in rear, each spring 37 inches long.

**WHEELS**—Heavy artillery type, equipped with 33x4-inch tires.

**EXTRA FEATURES**—Actual one-man top; Four 24-inch doors; Non-skid rear tires; Aluminum and linoleum running and floorboards; 20-operation body finish; Luxurious leather upholstery; Ventilating, rain-vision windshield; Duplex tire carrier in rear; Tuli searchlights; Emergency search lamp; Electric cigar lighter; Aluminum encased instrument board. All recording instruments combined in one unit; Positive gasoline gauge; Electric-flash oil gauge.

Sedan "Eight".....\$1460

Sedan "Four".....\$1150

Everybody interested in automobiles is talking "Eight." And thousands of them are only awaiting the right "Eight," at the right price, to place their order.

It is going to be impossible to produce nearly enough "Eights" to meet the demand.

The remarkable performance of experimental eight-cylinder cars in Detroit, including the Detroit, during the year has awakened a tremendous enthusiasm for this type of car.

The motoring public is as eager to see the "Eight"—to ride behind the wonderfully flexible motor—to control this remarkable source of power—as a "kiddie" is to inspect the contents of his stocking on Christmas morning.

This applies to pretty nearly every prospective buyer of a motor car in your territory.

Once a prospect has ridden behind an "Eight" he is going to be enthusiastic about it—and the advantage enjoyed by the dealer who sells the Detroit "Eight" in the matter of price and deliveries means a sale pretty nearly every time.

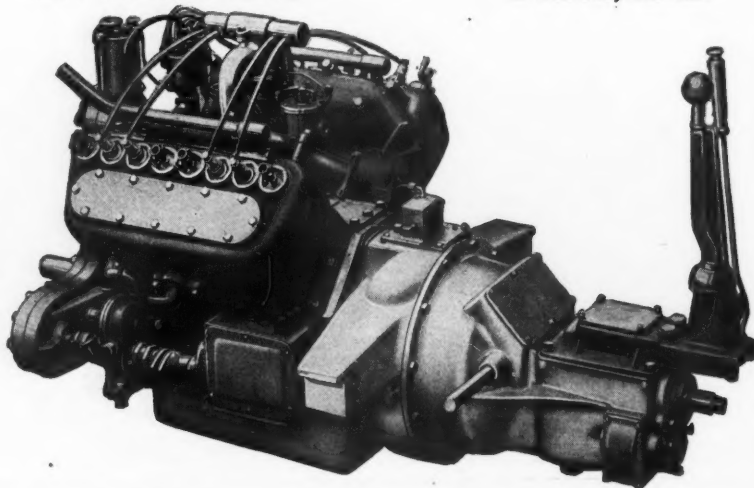
The cream of the business is yours with the Detroit "Eight."

Get our proposition—now, and a quick telegram is the safest way.

**BRIGGS-DETROITER CO.**

455 Holbrook Ave.

Detroit, Mich.

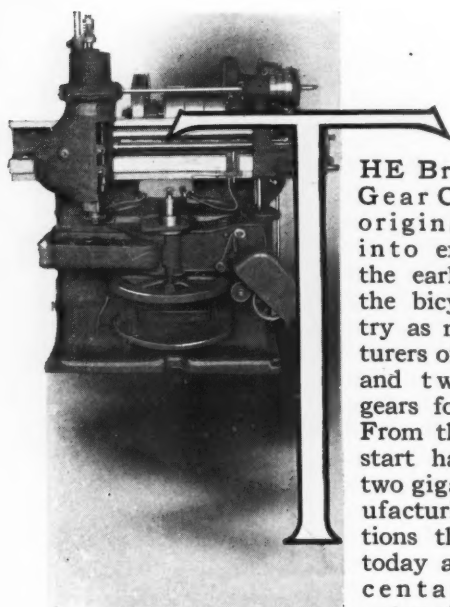


When Writing to Advertisers, Please Mention Motor Age.

BROWN-LIPE GEAR C<sup>o</sup>

SYRACUSE  
N·Y· U·S·A·

BROWN-LIPE-CHAPIN C<sup>o</sup>



**T**HE Brown-Lipe Gear Company originally came into existence in the early days of the bicycle industry as manufacturers of sprockets and two speed gears for bicycles. From that humble start has grown two gigantic manufacturing institutions that supply today a big percentage of the automobile manu-

facturers of this country with their differentials, transmissions and control sets. In the plant of the Brown-Lipe-Chapin Company are produced the differentials, while the Brown-Lipe Gear Company confines its manufacturing facilities to the production of the various types and forms of transmissions and control sets. Although the holding interests of the two concerns are practically identical, each occupies its own manufacturing establishment, and each is operated just as separately and distinctly as though they were separately owned and geographically located a thousand miles apart.

As the demands of the automobile industry increased by leaps and bounds, and as the standing of the Brown-Lipe products grew more and more pronounced, it became an absolute necessity for greatly increased manufacturing facilities to supply the industry with Brown-Lipe products. So the single factory which had been enlarged time and again became so inadequate that the two specialized businesses must be separated.

### New Company Formed

To accommodate this change a second company—the Brown-Lipe-Chapin Company—was organized and a mammoth new plant erected for the sole purpose of handling the differential end of the business. That these are incontrovertible facts may be well realized by the simple statement that in twelve recent consecutive months the output of Brown-Lipe products aggregated something around five millions of dollars, with a labor payroll in excess of a million—all for the production of these three component parts of a car.

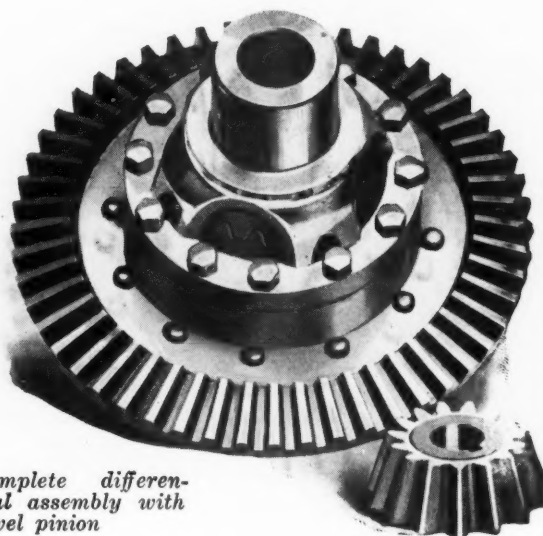
The publication of this advertisement and the advertisements that are to follow, is based purely upon a desire to justify in

the minds of dealers and consumers the wisdom of car and truck manufacturers in depending upon the Brown-Lipe organizations for such a vast percentage of these working parts.

When it is considered that the question of price has little or nothing to do with the sale of Brown-Lipe products, the simple fact of their dominating to such a marked degree, must evidence beyond contradiction the superiority of these Brown-Lipe products.

But we are not content to assume an air of independence and let our showing tell its own story, for we feel that around this enormous production can be built a story of modern manufacturing and merchandising that will give every user of Brown-Lipe products added confidence in his use of them, and which will give added emphasis to the sagacity and keen business judgment of the manufacturers who place their absolute dependence upon these products.

To the average car owner, as well, even, as to the ultra-intelligent car owner, and in many cases to the absolute trade itself, there is perhaps less known of the real problems and intricacies of gear manufacture than about most any other part of the car today. In the commonly accepted sense of the term, a differential is an unknown something that allows motor-driven apparatus to make a turn without breaking something, and the transmission is an unknown something that admits of various speeds of this motor-driven apparatus by the simple shifting of the lever. It is our purpose in this advertising campaign to set forth first in this announcement a general story of what these products are, and how they are made, and then in subsequent advertisements to show in detail the many and varied problems



*Complete differential assembly with bevel pinion*



and methods necessary for the manufacture of these products.

It should be remembered first—that in the generally accepted sense of the term, all Brown-Lipe products are of special construction; true enough, differentials are standardized—true enough, transmissions are standardized. But each and every car presents its own peculiar characteristics which, in most cases, require special engineering thought in designing such products as lend themselves most admirably to the particular characteristics of the car in question.

To take care of this phase of the situation, separate and distinct corps of engineers are employed, whose constant labor is not only to keep pace with advancements in design, but constantly to co-operate with the manufacturers of the country in the special designing of these parts to meet the special requirements of the individual car itself. However, the question of manufacture is largely the same in the various designs, and in describing these products in the following pages we will take as our subject representative products that illustrate the general output of the factories.

## D I F F E R E N T I A L S

In ordinary language, a differential is an assembly of gears that enables the rear wheels to move at different speeds. Everybody knows that when an automobile turns a corner the inside wheel—that is, the wheel nearest the curb—revolves slower than the outside wheel.

A simile to this condition is that of a line of soldiers marching. They are all going forward at the same speed; a command is given for a turn to the right; the man on the extreme right of the line immediately begins to mark time—that is, he moves his feet in the same time as all the rest of his fellow marchers, but his steps are very, very short; in other words, he pivots—simply changes his position before the command, to a position at a right angle.

But the man on the extreme left lengthens his stride and increases his speed greatly in order to keep the line straight, each man from the left to the right going just a bit slower than his immediate companion on the left. This really is the action of the rear wheels when the car moves away from a straight line. If, as in the case of a buggy, or of the front wheels, each rear wheel were separate and detached from the other or from any common union, there would be no need of a compensating device.

But in the automobile an entirely different mechanical problem is encountered. The two rear wheels, which are the driving members, are locked to each other by the main axle shaft, when the car is proceeding in a straight line, and are both revolving at the same speed and in proportion to the speed of the engine. Provision, therefore, must be made for a breaking of this lock when the speed of the two wheels becomes different. And it is this function of permitting one wheel to go slow and the other to go fast that is performed by what is known as the differential gear.

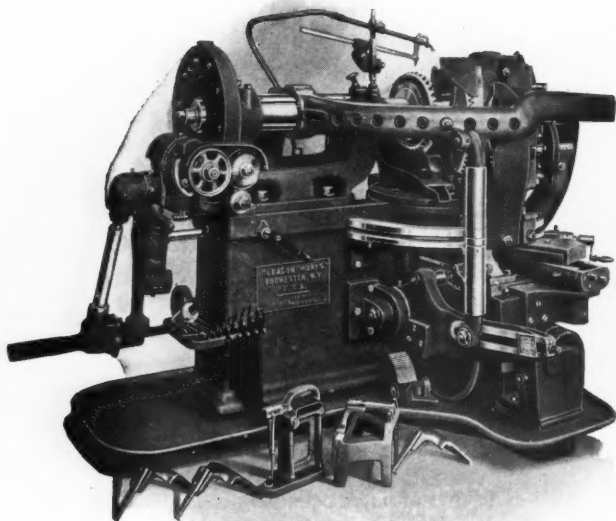
The differential set as shown on the opposite page, consists of a pair of cases, a four armed spider, two side gears, four side

pinion gears, twelve cap screws, one bevel drive gear, twelve rivets and one bevel drive pinion.

When your car is proceeding in a straight line your power is transmitted through the main driving shaft to the bevel pinion which is meshed with the bevel gear. As the shaft revolves this bevel pinion in turn revolves the bevel gear, which in turn revolves the main axle shaft and the entire differential assembly at right angles to the revolution of the main driving shaft of the engine. The main axle shaft is in two parts, each one attached firmly to its road wheel and differential side gear. This, of course, as you can see, simply makes the wheels revolve and propels the car forward.

*Eberhardt vertical cutting type automatic multiple spindle gear cutting machine for roughing out two or three spur or bevel gears*





*Gleason gear planer.  
One of a battery of machines used in generating bevel gear teeth*

Now then, when a turn is made, instead of the power revolving the entire differential as a unit, the two side gears and the four side pinions immediately begin to turn upon their bearings in the four arm spider. In this way the difference in speed between the two wheels is assimilated or compensated for within the differential itself, by the pinions and side gears.

Were it not for the use of this differential set, every time a car was turned from a straight path there would either be a slipping and tearing of the tires and wheels, or an absolute demoralization of the axle unit itself. The technical engineering data accounting for this really simple performance is extremely mathematical and complicated, and no attempt will be made here to go into a detailed explanation of just why and how these gears admit of these performances. But if anybody is interested enough to wish for the detailed engineering data connected with this operation, we will be glad to have our engineers furnish him with such detail.

As a typical illustration of the care and attention given to the production of a differential we will illustrate operation by operation, just what it means to produce a bevel gear. The same manufacturing conditions are encountered in making all of the gears, and the same care is taken in the handling of each and every part of the set; so that what is applicable to the bevel gear as shown by the following description, is applicable straight through the manufacturing operations of a differential set.

The gear blanks—which are drop forged rings of steel of approximately the shape of the finished bevel gear—are shipped from the forge plant to the differential factory.

The first operation is what is termed the rough forging inspection. These gear blanks are gone over carefully to see that there are no cracks or flaws apparent from an outside examination.

Then a certain fixed percentage of these blanks is drilled sufficiently to get samples of the steel, which samples are sent to the chemical laboratory for analysis. The entire shipment of rough forgings is held in the receiving stock-room until the samples have been thoroughly analyzed in the chemical laboratory to make sure that the chemical specifications of the steel in these forgings is in absolute accordance with the instructions contained in the ordering of the forgings themselves.

In other words, the Brown-Lipe Company knows, from years of study and experience, just what the chemical constituency of each piece of metal should be to give the best results in the performance of its work, and to avoid any possible errors in the manufacture of this steel this chemical analysis is most carefully made. After the chemical analysis the gear blanks are still further prepared for the first machine operation by going through a preliminary heat treating and annealing process. This makes the forgings uniform in constituency throughout and removes the forging strains or internal strains. If the forgings come up to specifications they are then started on the machining operations.

## Machine Operations

The first operation in the machine department consists of boring out the center of the gear and facing the back so that it presents an absolute right angle surface to the bored center. This operation is then inspected with micrometers to insure absolute accuracy of size and also is tested on specially constructed jigs.

From this inspection the gear is sent to another machine which turns the face angle and the back angle surfaces. This operation is inspected with micrometers and special gauges to insure proper measurements. At this time the blank is also placed in what is called a running fixture and inspected while running, to insure the trueness of the running gear.

The blank is then placed in a jig, drilled and counterbored. This operation is inspected in a special jig equipped with pins that insures accuracy of boring and counterboring of all the holes. At this point the various surfaces of the blank have been machined to such points of accuracy that the blank itself

can be held properly in a cutting machine which performs the next operation known as rough blocking or gashing the teeth.

Another inspection is made, and then the blank is sent to the gear generating department. It is at this point that perhaps the most unique operation in the entire manufacture of a gear takes place.

So remarkable is this process of generating a bevel gear that no attempt will be made to go into details at this time, but rather this matter will be left for treatment in an individual advertisement which will deal exclusively with this problem.

But some idea of the magnitude of the Brown-Lipe-Chapin Company may be gained from the statement at this time that the battery of Gleason gear generating machines installed in the Brown-Lipe-Chapin works is the largest battery of machines of this kind in the world.

When the gear blank comes from this operation it is completely machined, and to all outward

appearances, ready for work. To insure again positive accuracy in every way this gear, with all the machining operations completed, is sent to the inspection department where it is given a running test for sound, for the condition of tooth bearing and also for tooth measurements.

Then comes an operation which really calls for the most expert knowledge, and for the greatest amount of care and watchfulness in the entire manufacture of the product—the operation of hardening and heat treating. Up to this point we have been dealing with a piece of steel of such a carbon content as to admit readily of machining operations. It is obvious that if a piece of metal which is called upon to play as important a working part in the use of the auto-

### Hardening Problem

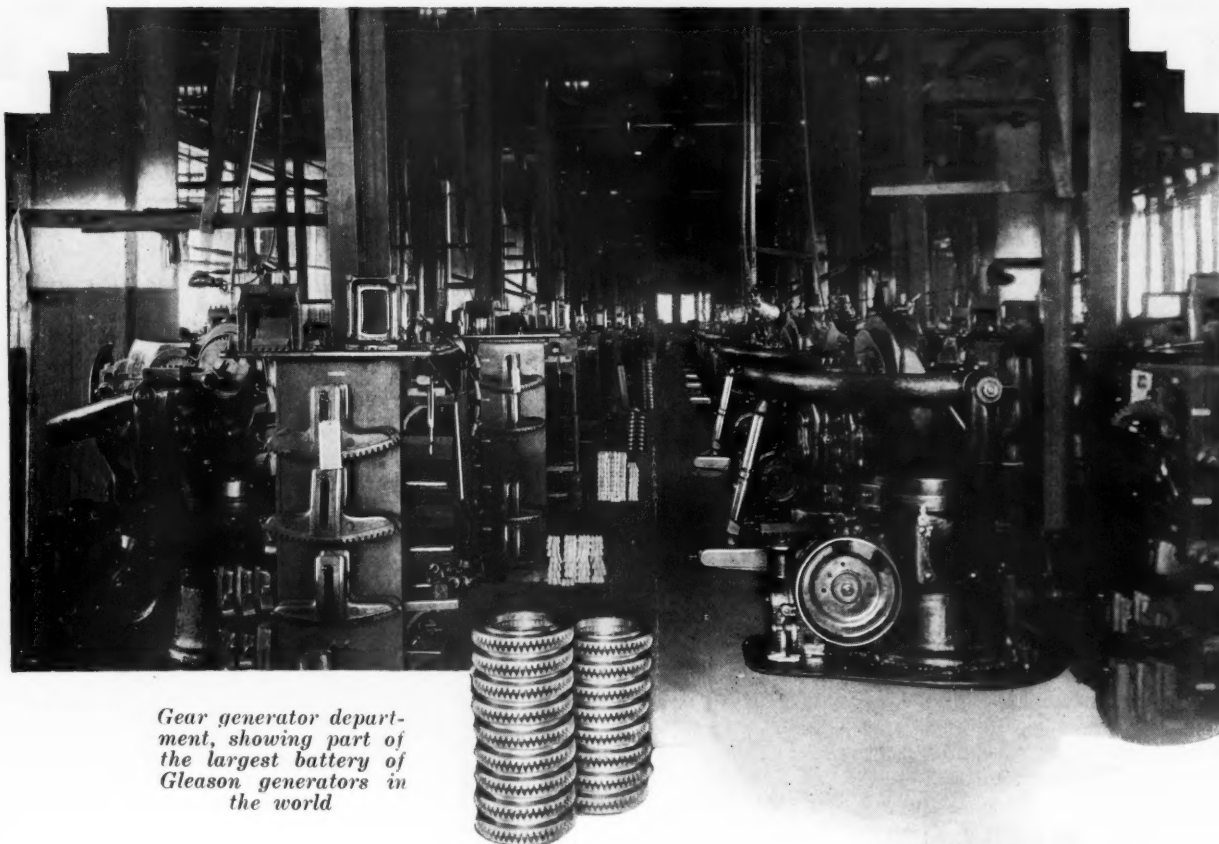
mobile as a bevel gear, were to be assembled into that automobile in so soft a physical condition as to admit of easy cutting, it would be but a short time until that gear would wear appreciably. That would mean looseness of fit, noise and general all around dissatisfaction.

So the surface of this gear—that is, the surface of the teeth of the gear, which are the parts subjected to fric-

*Grinding department, where side gears and pinions for the differentials are ground*







*Gear generator department, showing part of the largest battery of Gleason generators in the world*

tion—must be so hard as to practically resist wear during the operation of the car. At the same time the body of the tooth as differentiating from the surface of the tooth, must be tough and strong.

As we have shown before, if the surface of the tooth is soft enough to possess features of toughness and strength it is not hard enough to resist wear when in mesh and running.

Inversely, if the whole tooth, that is, both body and surface be hard enough to resist wear on the surface, then the tooth will be brittle and not tough enough to keep from breaking off under the strain of driving.

So that in the hardening department these two contrasting conditions must be faced, namely: to so treat the finished machine blank as to present a hard, wear-resisting surface on the teeth, and at the same time to retain a more soft, but more tough core or body in the tooth.

So these gears are sent to the hardening department and subjected to a carburizing process which hardens the surface of the gear to a depth of 1-32 of an inch, and refines and toughens the core. So wonderful a subject is this question of heat treating that on succeeding pages of this advertisement we will go

into the detail concerning the operation of a heat treating furnace.

The hardened gear is then sent to the testing department in the heat treating room, and by a variety of unique tests, is examined as to its hardness and evenness of hardening.

Then the gear is sent to another machine for straightening these gears inasmuch as frequently they bulge out of true during their subjection to the extreme heat. After being straightened the gear is again subjected to running tests and endurance tests, when it is ready for the grinding or sand blasting room. After being polished to mirror smoothness, the finished gear is again inspected for dimensions, and finally is subjected to its last running test for trueness.

You have probably noticed in following through this manufacturing process, that "inspection" and "test" are two words very frequently encountered. It is because Brown-Lipe products are subjected to this careful and exhaustive inspection and testing largely that they enjoy the enviable reputation in which they are held by the manufacturing public. And it is this reason also that accounts in a great measure for the extreme life and satisfactory service rendered by Brown-Lipe products.

## HEAT TREATING

As indicated in one of the preceding pages, there is perhaps no single operation or handling which is fraught with so much importance, or which has required so much experimentation in the perfecting of the process, as that of the heat treating of the metal after it has been machined. For this reason the heat treating departments of the Brown-Lipe Companies are beyond doubt the most thorough and most modern, both in physical and mental equipment, of any heat treating plant known, and the methods employed to insure absolute results are most extensive and complete.

When the gears are brought into the heat treating department they are first turned over to an operator who lays them out to be placed in a certain furnace. Each individual gear is

### Gears Numbered

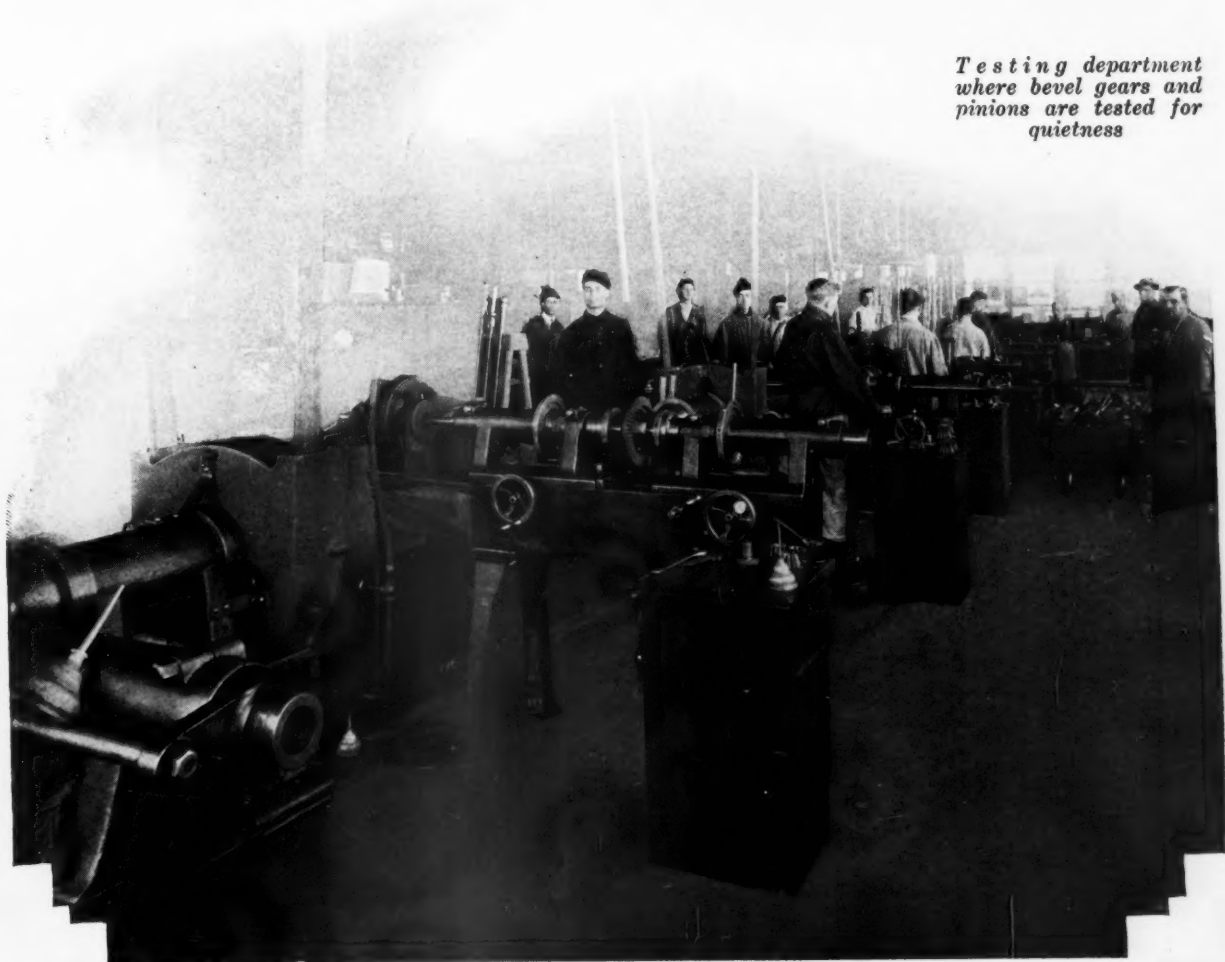
then numbered in such a manner that two or three years afterwards, if the case requires, the gear can be identified as having been heated upon a certain day, in a certain furnace,—in a

certain pot and the position in which that pot was placed in that furnace. The exact number of hours it was in that furnace and the amount of heat that was put into it can also be told from individual records that are kept of each furnace during each heat of every day.

After the gears are thus identified, the screw holes and rivet holes are plugged with fire clay so as to prevent the carburizing mixture from coming into contact with anything other than the surface. Together with this secret carburizing mixture the gear blanks are then packed in hollow center round fire pots, the tops of which are luted on with fire clay so as to make the pots practically hermetically sealed. These pots are then put into the furnace which has been brought up to a certain temperature, and the heat treating process has been started.

It must be understood that the results obtained by this heat treating—that is, the laying of 1-32 of an inch hard surface and the retaining of a comparatively soft, tough, strong core—is accom-

*Testing department  
where bevel gears and  
pinions are tested for  
quietness*





*Case hardening and heat treating department—carburizing pots at right*

plished by driving carbon into the surface of the gear while it lays in the carburizing mixture in the furnace.

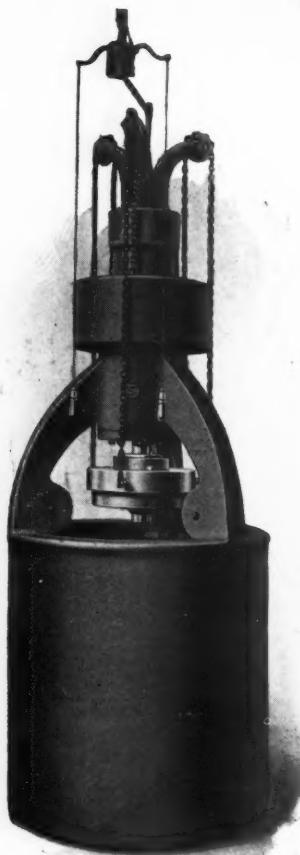
As a matter of fact it is the gases generated inside of this hermetically sealed fire pot that do the work. When the rough blank of a carbon steel gear is brought to the heat treating department it is uniformly of about .20 carbon from center to surface; when it leaves the heat treating department the center remains substantially the same with a very slight variation to both surfaces, while the surfaces themselves to a depth of 1-32 of an inch must contain 1.00 carbon.

### Heat Measured

A somewhat homely analogy to the heat treating of metal is that of baking bread. The molded loaves are placed in the oven and the fire is maintained at a certain heat for a certain length of time. If the oven be too hot the outside of the bread is hard and the inside is raw. If it be too cool and if it required too long a time to bake the bread, it is heavy and unsatisfactory in every way.

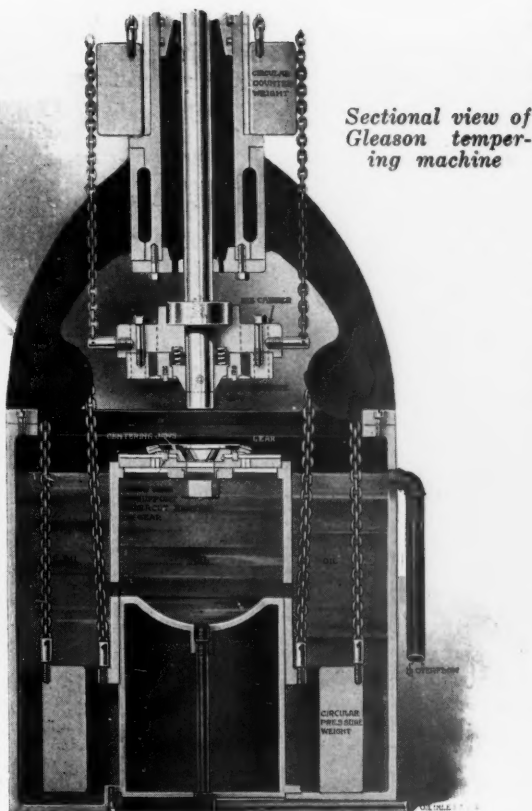
And just so with the heat treating of metal, only to an unlimited greater degree. Years of experience and experimentation have shown metallurgists just the best method to follow to produce given results, and where our bread-bakers only look at the oven once or twice

during the baking, there is the most accurate and most absolute check kept on every furnace during every minute of its work—and here it is that the real heat treating takes place.



*Gleason tempering machine—Straightens gears while hot*





*Sectional view of  
Gleason temper-  
ing machine*

Connected to each furnace is an electric heat registering device known as a pyrometer. This is really an electric thermometer so constructed that it registers the heat of the furnace either at the furnace or many feet away from the furnace.

In the Brown-Lipe plant each furnace pyrometer is connected with a registering device in a room in one end of the building, before which sits an operator whose sole duty is to read and record the temperature of each and every furnace every five minutes during the carburizing process, which averages about 7 1-4 hours.

Just let that thought sink into your mind deeply—every five minutes of all this time an absolute record is made of the condition of the furnace. This operator knows that when the metal was first placed into the heating furnace that it registered a certain temperature, and it is his duty by these five minute checkings to see that the temperature of that furnace is constantly and steadily raised a certain number of degrees at certain regular intervals until at the end of the time necessary to complete the heat, a certain fixed temperature shall have been attained.

In other words, it is his duty to see that, if the temperature of a certain furnace at starting is 1185 degrees F., after the doors have been closed and the fire commences to work regularly, that furnace shall continue to

increase its heat a few degrees at a time, until at the end of 2 1-2 or 3 hours according to his instructions from the metallurgist in charge of the operation, the heat in that furnace shall be 1600 degrees F., without the temperature ever having fallen backward during the process of raising it.

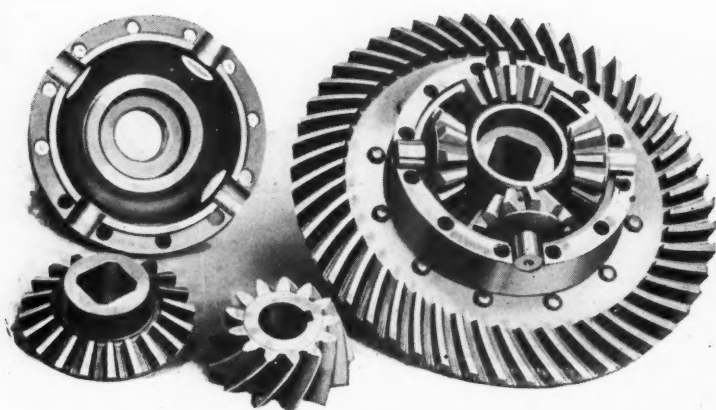
And in the watching of this operation this furnace is not allowed to vary over 10 degrees one way or the other. As the operator looks over his charts, if he sees that one furnace is not rising as fast as it should, or is rising too fast—that is, if the variations are 10 plus or minus from the curve which the heat should follow, he immediately notifies the man in charge of the furnace. If there is still a variation, the foreman is notified, and in turn the metallurgist himself in charge of the plant is informed and consulted.

After the gears have been properly carburized they are drawn from the fire and quenched in an oil bath, the oil of which is held at a certain definite temperature by an efficient cooling system. This treatment is for the purpose of refining the core or the central tough portion. Then when the gears are cooled to the temperature of the bath they again are heated up uniformly to 1425 degrees F., for the purpose of refining the hard shell or case which has been left in a very crystalline condition, due to the high heat used in refining the core.

Occasionally it is found that the gears in the process of case hardening warp out of true. To compensate for this warping such gears as have been found to be warped are straightened while hot in the quench bath by means of a newly devised straightening machine used for that purpose. The heat treatment completed, the gears are then sent to the testing department in the heat treating shop, and most thoroughly and carefully tested almost tooth by tooth to



*Fractured gears  
showing case  
hardening  
results. Lower  
piece faulty—no  
case hardening.  
Upper piece good.  
Note hard strip  
around edges of  
fracture at right  
of good gear*



*Spiral bevel drive differential partly disassembled and spiral bevel drive pinion*

which is known as the fire end. To insure absolute uniformity and exactness of temperature, these fire ends are changed on every pyrometer every Saturday so as to eliminate any possible danger of undue wearing or leakage of current of any sort.

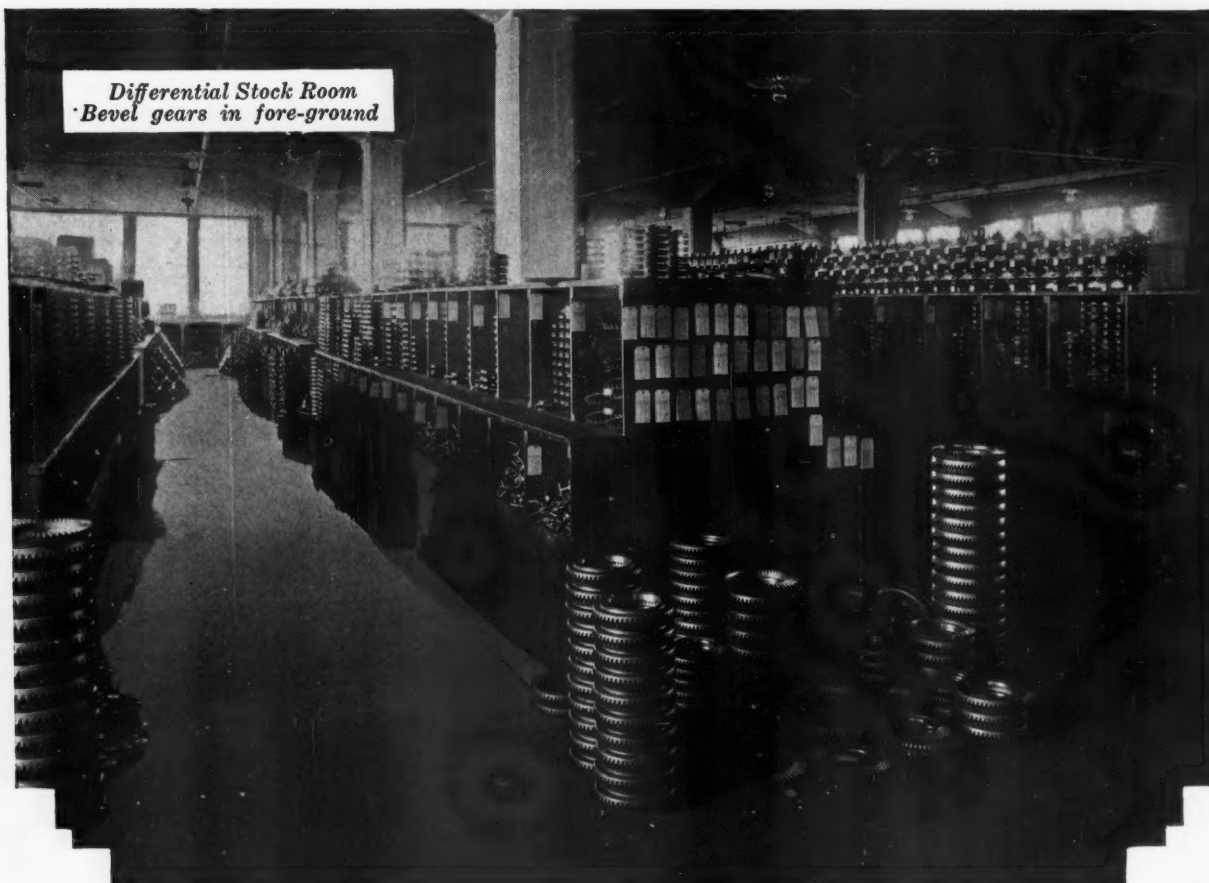
These new fire ends, previous to being placed in the furnace are standardized against a Bureau of Standards Couple which is gotten out in Washington, D. C.

be sure that the proper amount of hardness and the proper depth of hardness have been obtained.

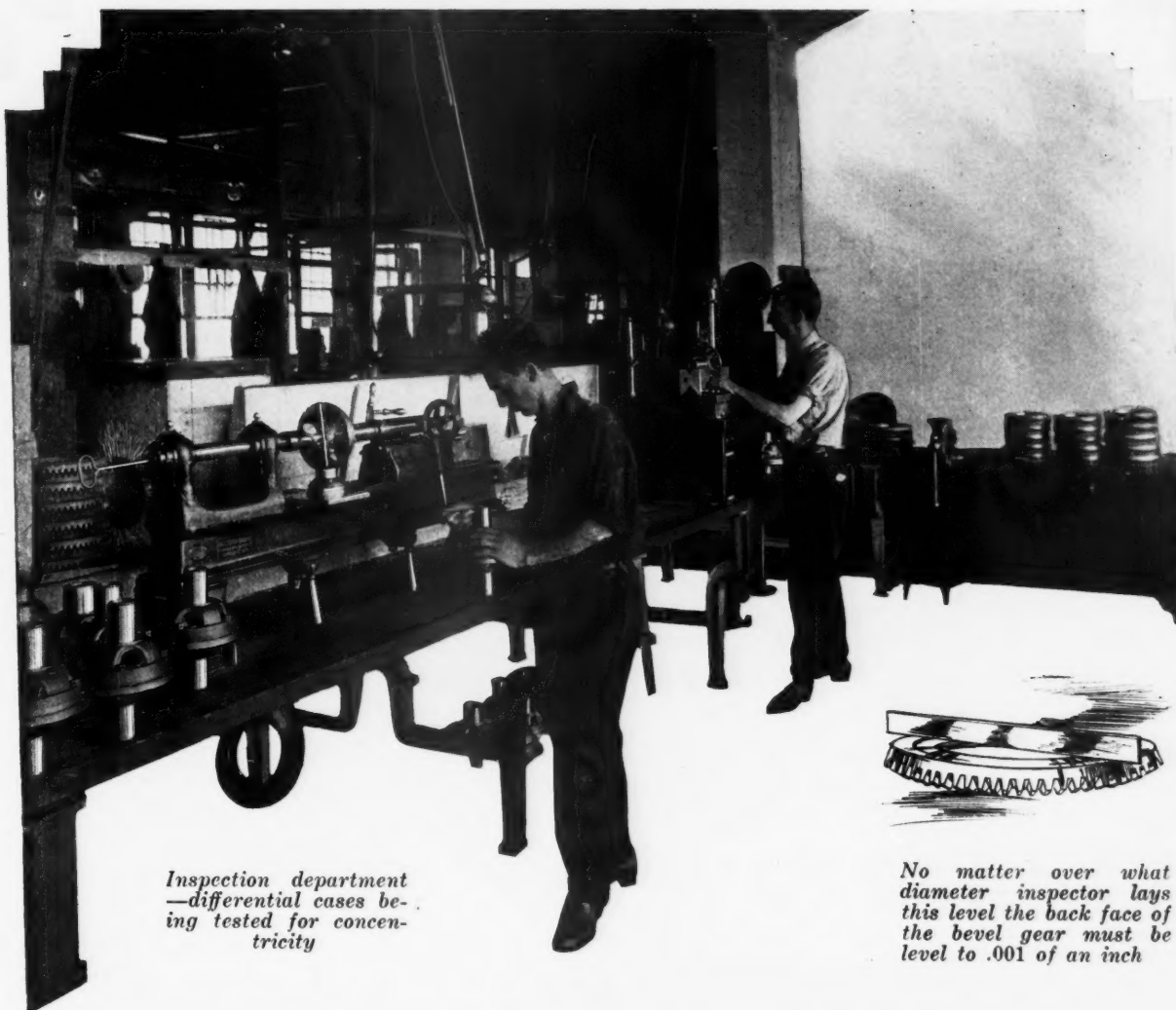
Just another little instance in connection with the accuracy employed throughout this heat treating department. We wish to refer again to the question of the pyrometer. These pyrometers operate on the principle that when you place two different metals in contact—for instance, copper-nickel alloy and iron—and apply heat at the point of contact, an electrical current is set up. In these pyrometers, therefore, there is a contact so constructed, which goes inside of the furnace and

From the recording station to the fire end of the Brown-Lipe heating plant is a distance perhaps of a hundred feet, and wires connected with the pyrometers at the far furnaces must be carried up to the other end of the building to the recording table.

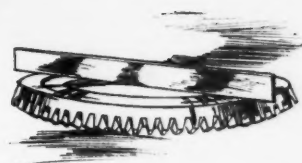
Ordinarily electricity is conducted through copper wires, but in the conducting of the temperature variations from the pyrometers in the Brown-Lipe furnaces to the recording table, a condition arises, so minute in importance to the average lay mind as hardly to be realized, that calls for a change in this general practice of



*Differential Stock Room  
Bevel gears in fore-ground*



*Inspection department  
—differential cases be-  
ing tested for concen-  
tricity*



*No matter over what  
diameter inspector lays  
this level the back face of  
the bevel gear must be  
level to .001 of an inch*

conducting the current by copper. As we have stated before, whenever and wherever two different metals are united in the presence of heat, an electric current is set up, and in these pyrometers copper and iron are united in the furnaces to set up this electrical current. Now, then, if another union of copper and iron were made to the iron terminal of the pyrometer outside of the furnace—as would be the case if a pair of copper wires were used to transmit this current from the furnace to the recording table—a counter current would be set up at the second point of contact of the copper wire with the iron. So,

to avoid even so minute a variation as might be occasioned by this second junction of copper and iron even at a very low temperature, and which would be small, a special insulated iron wire is carried straight through from the pyrometer to the recording table.

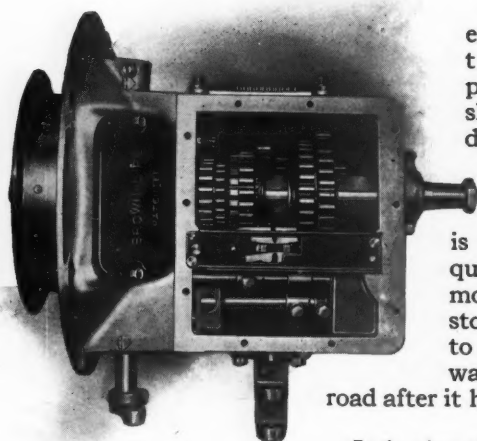
Emphasis is laid upon this apparently unimportant detail solely for the purpose of carrying conviction on the point that every single possible safeguard to insure the greatest efficiency in the finished product is employed throughout the Brown-Lipe organization.

## TRANSMISSIONS

As is generally known, a transmission set is a combination of gears and shafts that provide for variable speeds and variable power applications to the driving wheel of a car. The necessity for the use of a transmission set is based on the principle that in internal combustion engines the power delivered by the engine is abso-

lutely correlated to the speed at which the engine is revolving; in other words, if at 200 revolutions per minute a certain gas engine is delivering a power impulse of 3 h. p., at ten times that speed, or 2000 revolutions per minute, that engine is providing approximately ten times that power, or 30 h. p.





Transmission

In the driving of every car there are times when great power is required at slow speed, as evidenced in the starting of a car or in driving through mud or hill climbing. It is obvious that it requires more power to move a car from a dead stop into motion, than to propel that car forward on a perfectly level road after it has been set in motion.

It is also obvious that it requires more power at slower speed to drive that car through mud or up a hill than it required to drive it along a level road, and it must be borne in mind all the time that more power can only be obtained through greater speed of the engine.

To accommodate this condition the transmission is built so that while the engine may be turning over at top speed and delivering its maximum of power, you are still able to gear down the car so that it is not moving at top speed. Then, too, a device of some sort is necessary to provide for the question of reverse, or driving the car backward.

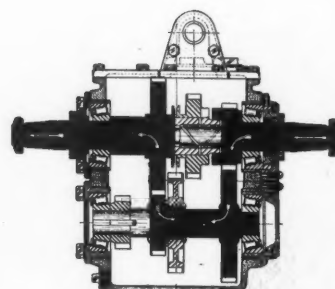
The average transmission set as exemplified in the unit power plant and multiple disc clutch construction consists, first—of the case which contains the gears and shafts. In this case is the driving gear which takes the power from the engine through the driving shaft; then there is what is called the square or rear shaft, on which are mounted two sliding gears, one of which provides the intermediate and direct speed; and the other of which operated in one direction provides low speeds, while operating in the other direction provides the reverse speed, this being a description of a three speed forward and reverse transmission.

### Use of Transmission

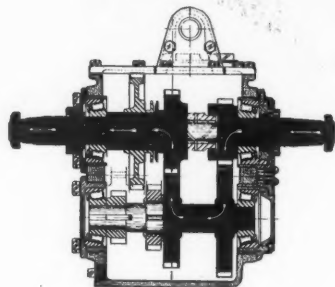
Then there is a counter-shaft which carries the counter-shaft drive gear, the intermediate speed gear, the low speed gear and the reverse speed gear. Of course, there are the bearing retainers and the various bearings which support the different shafts. Then there is what is called an idler, mounted on a stud, which is used in the obtaining of the reverse gear. The use of the transmission is very simple.

The main driving shaft is of course always revolving at engine speed, and when the car is driving on what is called "high" the wheels are turning by means of a direct transmission of actual engine speed from the crank shaft of the engine to the differential gear. When you select your gear, whether it be first or second, you simply throw out your direct connection between the main driving shaft of the car and the crank shaft of the engine through the transmission set, and interpose in the line of drive a set of gears.

An illustration of every day occurrence is seen in the bicycle. The front sprocket which is connected to your pedals,

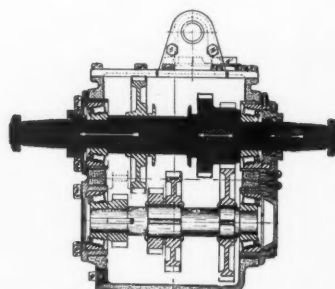


First Speed

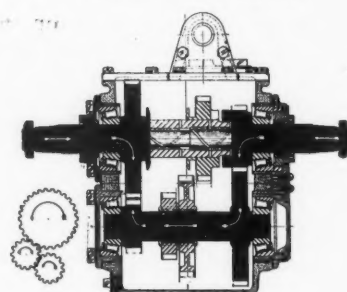


Second Speed

Solid black indicates power line. White blocks in solid black indicate gear meshing—arrows show direction of power.



Third or Direct Speed



Reverse Speed

Note that in direct the gears do not play any active part in transmitting power. In the reverse an odd gear called the idler gear is introduced in the train of gears which causes the axle end of the split shaft to rotate in opposite direction to the engine end of the split shaft

is a great big gear with a great number of teeth, while the rear sprocket—that is, the sprocket which is attached to the rear wheel—is a small gear with a small number of teeth. For every revolution that one pedal makes, or for every revolution that the big sprocket makes, the little sprocket on the rear wheel, and consequently the wheel itself, makes several revolutions. So that by turning your feet over once you revolve your wheel several times, the exact differential being direct in proportion to the number of teeth on the two sprocket wheels. Now, if you were to put your small sprocket on the pedal of your bicycle, and the big sprocket on the rear wheel—as is usually the case with trick bicycle riders on the stage—your feet would have to revolve two or three times to make the rear wheel revolve once; in other words, the power application might be identically the same at the pedals, but the speed of the bicycle would be different.

In your three speed transmission case the reverse principle of the average bicycle construction is in vogue. For very low speeds you put a gear of small size connected with the engine into operation with a gear of big size connected with the driving shaft of the car. For your intermediate speed you put this same small gear connected with your engine into operation with a smaller gear than used in the low selective,

and yet a gear which is larger than the driving gear. And in reverse you simply use three gears instead of two gears.

In the case of a four speed transmission where you get your fourth speed on what is called a "step up" you simply call into play the exact bicycle construction—that is, you use a small driving gear with a still smaller gear connected to the main shaft of your car; in other words, for every revolution of your engine the driving shaft of your car is revolving faster than the engine.

In the transmission department the general practice is, so far as the machining and heat treating operation, identical with those described under the heading of "Differentials," with the exception, of course, that in the differential department most of the gear cutting is bevel, while in the transmission department there are no bevel gears.

In the production of the transmission gears in the Brown-Lipe plant, however, there is one feature which is carefully watched, that is perhaps a little at variance with common practice. In the generating of gears several blanks are laid one upon the other, and then put into the gear shaper in such a manner that the cutting tool works up and down over three or four or more gears at the same time.

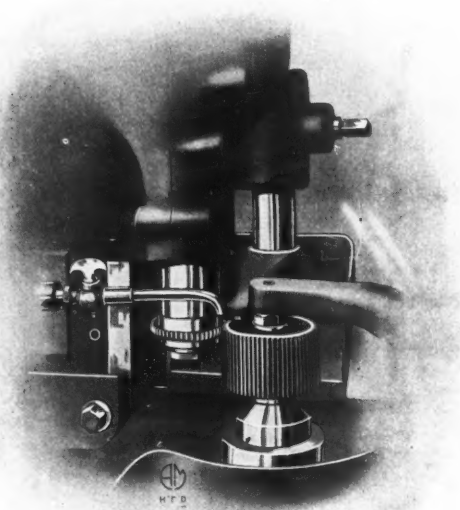


*Fellows gear shapers cutting teeth in transmission gears*



*Grinding department  
where transmission  
gears and shafts are  
ground*

*Fellows Gear  
Shaper showing cut-  
ter at work*



In order to have all these teeth cut at absolute right angles to the face of the gear, or in other words, to have the line of the tooth absolutely parallel with the shaft to which it is attached, the gear blank faces must be absolutely parallel and accurate. So that instead of simply assembling these blanks as they first come from the forge, all the gear faces are first ground absolutely parallel before shaping, then when they are stacked and placed in the gear shaper, the gear teeth must be cut absolutely at right angles with the face of the gear.

It is in this work—this preliminary machine work, that a very marked manufacturing refinement takes place in the Brown-Lipe Plant.

For where in cheap manufacturing this first machining operation is slighted, in the Brown-Lipe Transmission work it is held to absolute limits.

In the construction of the case in Brown-Lipe Heavy Duty Transmissions all the bearings







In the transmission tolerance limits of .0005 of an inch are encountered more generally than limits of .001 of an inch. Both the main shaft and the countershaft at every bearing fit are held to the specified dimensions within a minus limit of .0005 and with absolutely no over-size. In other words, the instructions to the mechanic who finishes those shafts are that his limit of tolerance

from measurements is plus nothing and minus .0005 of an inch.

Where the aluminum case is bored to furnish a seat for the bearing cage in which the shafts are mounted, the limit is plus or minus .001, while the bore of the bearing cage itself is held to a limit of plus .001 and minus nothing.

The grinding limits for the gear fits on the countershaft are plus or minus .0005 while the grinding limit on the square shaft upon which the sliding gears slide is absolutely nothing. All gears must be concentric—the measurement of concentricity being from centre of the gear to the pitch line of the teeth—to a limit of .001 of an inch.

And so right on through the entire manufacture of every Brown-Lipe product.

Combine these microscopical manufacturing conditions with a design which contemplates only the production of a part that will give the maximum of service with the minimum of weight and practical elimination of noise—

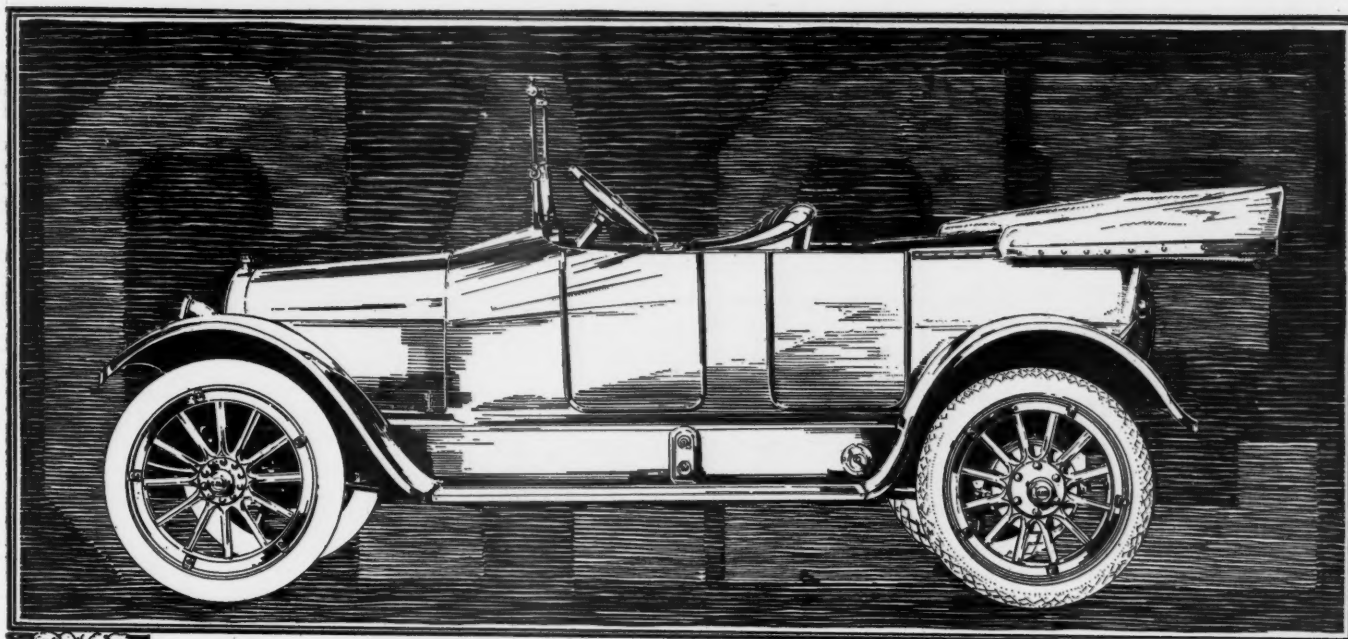
Combine these manufacturing conditions and this superiority of design with the fact that the metal which enters into these parts is most carefully analyzed chemically and held absolutely to the specifications we know to be best suited to the requirements—

Combine these superior points of design, workmanship, inspection and materials with the final fact that this product is treated to a degree of accuracy and perfection almost superhuman to the lay mind and you have again our reasons for claiming that

Brown-Lipe products are unquestionably the standards by which all competitive products are measured.

BROWN - LIPE GEAR CO.  
SYRACUSE, N. Y., U. S. A.  
BROWN - LIPE - CHAPIN CO.





## The NAME BEHIND the CAR

### And What it Means to the Man Who Reasons

#### Ability and Responsibility

The known ability of the maker comes before everything else. Because, in your car, the "hidden values" rest solely upon his *ability* to put them there. Then upon his *reputation* for putting them there. That is what "The Name Behind the Car" means to the man who reasons.

Sound business reasoning guides the men who are buying CASE cars. They discriminate between popularity that is *meteoric* and success that is *merited*—won through the experience of 72 years of manufacturing and of selling throughout the markets of the world.

These cautious buyers know that CASE *behind* the car stands for Supreme Achievement in the car.

#### Values Seen and Unseen

Note CASE Specifications—their *character*—their *completeness*—the splendid features of which the costliest cars for next year boast, as you know. These values all can see.

But by *unseen values* the Case Company means, for example, the hairline exactness of machined parts; laboratory determination of the limits of alloy steels.

In such, lie the *vitals* of your car that determine the wisdom of your investment.

This company safeguards your interest in these particulars by habit, born of proven service and a reputation for products of highest excellence.

#### Price Fairly Judged

The intelligent way to judge the price of a car is to divide that price by the number of years of service of that car. On this basis the cost to you of a CASE car is astoundingly low.

This is largely due to the unique advantage of this company which enables us to make a substantial saving *after CASE cars are built!*

For we have 79 branches, 600 travelers and 9,000 dealers in United States, Canada, South America, Europe, Asia, Africa and the Philippine Islands handling our other products. Therefore, the prices of the CASE cars do not include a heavy sales expense.

Thus we *save* where others must *spend*. And so we *spend* where others must *save*. Result: Better materials, better workmanship, better equipment, better price.

### CASE "25" \$1350 5% discount if cash

This car will be shown at the New York and Chicago shows

#### BODY:

Distinctive Streamline, with concealed hardware.

Upholstering—Genuine leather, high-grade curled hair.

Cushion Springs—Strong, deep and comfortable.

Full-size door openings.

Actual five-passenger capacity. Foot and robe rails. Protective covering on back of front seat.

One-Man mohair top, with quick-adjustable side curtains, folded in top.

Top cover enclosing bows.

Windshield, rain vision, ventilating.

15-gallon cowl gasoline tank, with gauge; tank easily removed without disturbing body.

#### CHASSIS:

Motor—Built in our own shops: T-Head, 3 3/4 inch x 4 3/4 inch.

Starting and Lighting—Westinghouse six-volt system.

Ignition—Westinghouse high tension, separate unit. Automatic spark control.

Carburation—Hot-air device; dash control.

Spark plugs located in centers of high-compression cylinders.

Highest grade Wasson piston rings.

Crank-shaft and connecting-rod bearings, bronze backed, lined with very highest grade babbit.

Crank shafts, connecting rods and cam shafts of Case special formula steels forged and heat treated in our own shops.

Valves—Solid 3 1/2 per cent nickel steel.

Lubrication—Splash system, constant level maintained by positive-driven plunger pump in connection with non-leaking circulation indicator on dash.

Radiator—New-design core construction of unusual efficiency and strength.

Clutch—Multiple disc, best high-friction non-burnable facings on steel.

Spicer Universal Joint.

Transmission—Gears and shafts of special alloy steel, Timken bearings throughout.

Axles—Front, I-Beam section, steering knuckles and arms all forged and heat treated in Case shops from chrome-nickel steels, Timken bearings.

Rear—Advanced design, floating; pressed-steel housing; large bearings and driving gears; distinctive Case hubs and caps. Brakes—unusually large, 14-inch drum, 2 1/2-inch face.

Frame—Very strong construction, with large factor of safety. Clean running boards of pressed steel, linoleum covered, aluminum bound.

Spring Suspension—Long, easy riding, floating cantilever type, phosphor-bronze bushings, all main plates special analysis alloy steel.

Pressed Steel Crown fenders.

Wheelbase—115 1/2 inches.

Drive—Left-hand, center control.

Large, 18-inch corrugated steering wheel; horn button in center.

Headlights, double bulb; tail light, number lighting, with Chicago switch; dash light; work light on 10-foot cord.

All single-wire system.

Tires—34-inch x 4-inch, non-skid on rear wheels; demountable rims.

Color—Dark Brewster green.

**EQUIPMENT:**

Extra Casing and Tube on Rim, with Cover.

Weed Tire Chains.

Eight-day Clock.

Speedometer.

Electric Horn.

Jack, Tire Pump, Repair Kit and Usual Tools.

CASE "25" . . . \$1350

CASE "35" . . . \$1600

CASE "40" . . . \$1800

5% Discount if Cash

May we send you our catalog describing CASE cars?

J. I. Case T. M. Company, Inc.

FOUNDED 1842

507 Liberty Street  
Racine, Wis.

#### Choice Openings for Aggressive Dealers

We have decided to extend agencies in certain territories for the new Case car to large and small dealers who have heretofore had no connection with our wide-spread sales organization. This presents a rare opportunity to men alive to the growing demand for this real VALUE CAR. All applications and inquiries are handled in the order of arrival. The priority of a day may be vital to you. Write or wire us before it is too late.

# CASE

## The Car With the Famous Engine

When Writing to Advertisers, Please Mention Motor Age.

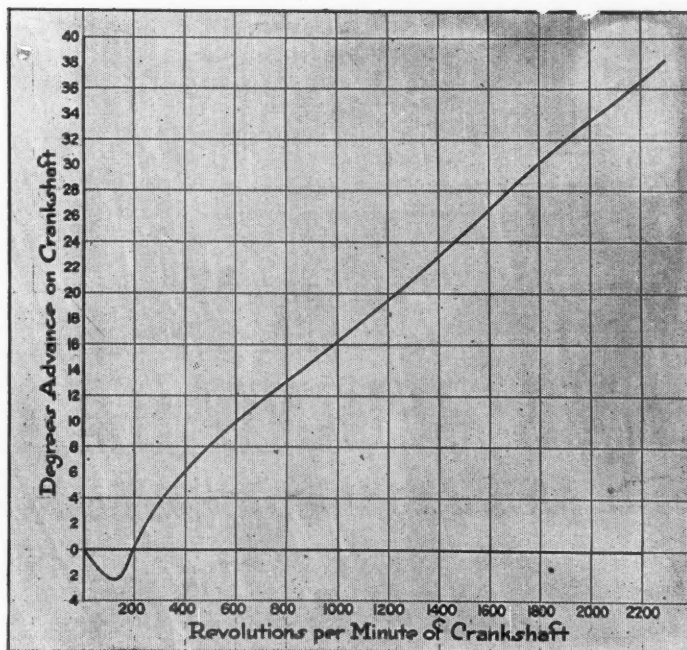




**ATWATER  
KENT**

"The governor automatically advances and retards the spark with the speed of the engine much better than the same operation can be performed manually by an inexperienced driver."

Regal Motor  
Car Company,  
M. S. Young,  
Eng.



"The Atwater Kent System is practically the only one with a successful automatic spark advance which relieves the driver of all concern regarding the setting of the spark, and does its work as efficiently at one speed as others."

R. E. Cole, chief  
engineer, Saxon  
Motor Co.

## Spark Advance Curve of the ATWATER KENT IGNITION SYSTEM

The value of an automatic spark control depends on the regularity of the advance.

An irregular "curve" may be worse than manual control, erratic though the latter usually is.

A uniform curve will give a smooth action and rapid acceleration very difficult to duplicate by hand.

As some curiosity has been expressed regarding the true nature of the Atwater Kent curve, we here publish a typical photograph from a recent test of a stock instrument.

**Atwater Kent Mfg. Works**  
4934 Stenton Ave., Philadelphia, Pa.


**REGAL**

**F. W. HAINES**  
 PRES.

**F. L. PIERCE**  
 SALES MGR.

**F. W. CHAFFEE**  
 SALES PROMOTION

**W. R. ALEXANDER**  
 SALES PROMOTION

**C. E. WOLFOLK**  
 ADVERTISING MGR.

## The Sales Promotion

The REGAL organization offers you a friendly spirit of helpfulness—co-operation—a readiness to use every resource—exert every effort in assisting you to sell REGAL cars.

The REGAL advertising is comprehensive—thorough—consistent—persistent—productive of many inquiries—the names of YOUR prospective customers. But we do not stop here—we go much farther—helping you to keep in touch with these people—to stimulate their interest—arouse their enthusiasm.

Every one of them receives the well written letters and beautiful printed matter of a carefully planned "follow-up" campaign; fully explaining the superior advantages of the REGAL—stimulating a desire to ride in it—bringing together the REGAL, YOURSELF and a CUSTOMER—This is the REGAL method of "SALES PROMOTION."

There is some good territory to be had and the REGAL proposition to dealers will be explained to you in the first letter—it is worth knowing about.

### THE SIX REASONS

1. *The Car Itself*
2. *The Organization Behind the Car*
3. *The Advertising*
4. *The Sales Promotion*
5. *The Regal Service*
6. *The Proposition to Dealers*

**Regal Motor Car Company**  
 201 Piquette Ave.      Detroit, Mich.

*Canadian Regal Motors, Ltd., Berlin, Ont.*



**\$ 10 8/5**

*When Writing to Advertisers, Please Mention Motor Age.*

# 97% OF ALL THE AT THE NEW H O U K

FROM basement to roof,  
practically every one of the  
choicest cars shown was equip-  
ped with wire wheels.

Visitors to the show, without excep-  
tion, carried away the impression that  
*wire wheels* add the inescapable touch  
of refinement to the **1915** car.

There were speed cars, and roadsters,  
and touring cars, and limousines, in their  
handsomest and gayest attire, all equip-  
ped with the beautiful HOUK wheel.

## H O U K M A N U F A C

1702 Elmwood Ave.,



# WIRE WHEELS SHOWN YORK SHOW WERE DETACHABLE WIRE WHEELS

**HOUK** wheels come in baked enamel to suit the color of the car and give a distinction of appearance absolutely indispensable to a choice car.

But—**HOUK WHEELS** are not selected merely for their appearance. They are accepted by engineers and adopted by car manufacturers because they have proved their tremendous value as **safety factors** and **tire savers**.

The day of wire-wheel probation is absolutely past—they have now taken their place as the greatest single addition to the mechanical perfection of the modern motor car.

The growth of the **WIRE WHEEL** in the U. S. A. as demonstrated by the New York Show.

In 1912 there were two cars exhibited at the New York Show equipped with wire wheels.

In 1913 there were nine cars shown so equipped.

In 1914 there were more than twice as many as in the previous year.

In 1915, without exception, all the choicest cars are equipped with wire wheels, and practically every car manufacturer in the country is fitting his cars with wire wheels as stock or optional equipment.

**1915 is the wire wheel year.**

## TURING COMPANY

BUFFALO, NEW YORK

# The LEXINGTON

## We Invite the Test of the Hard Driving Motorist

The man who knows all about motor cars—who can analyze the strong and weak parts of a car when it is standing still or when it is flying over the road. We want him to study the motor, transmission, axle, spring, and frame—every fixed and moving part.

Then we want him to take the wheel, and put the car through its paces, at all speeds, over all kinds of roads and as many hills as are accessible.

That's the test of a real automobile.

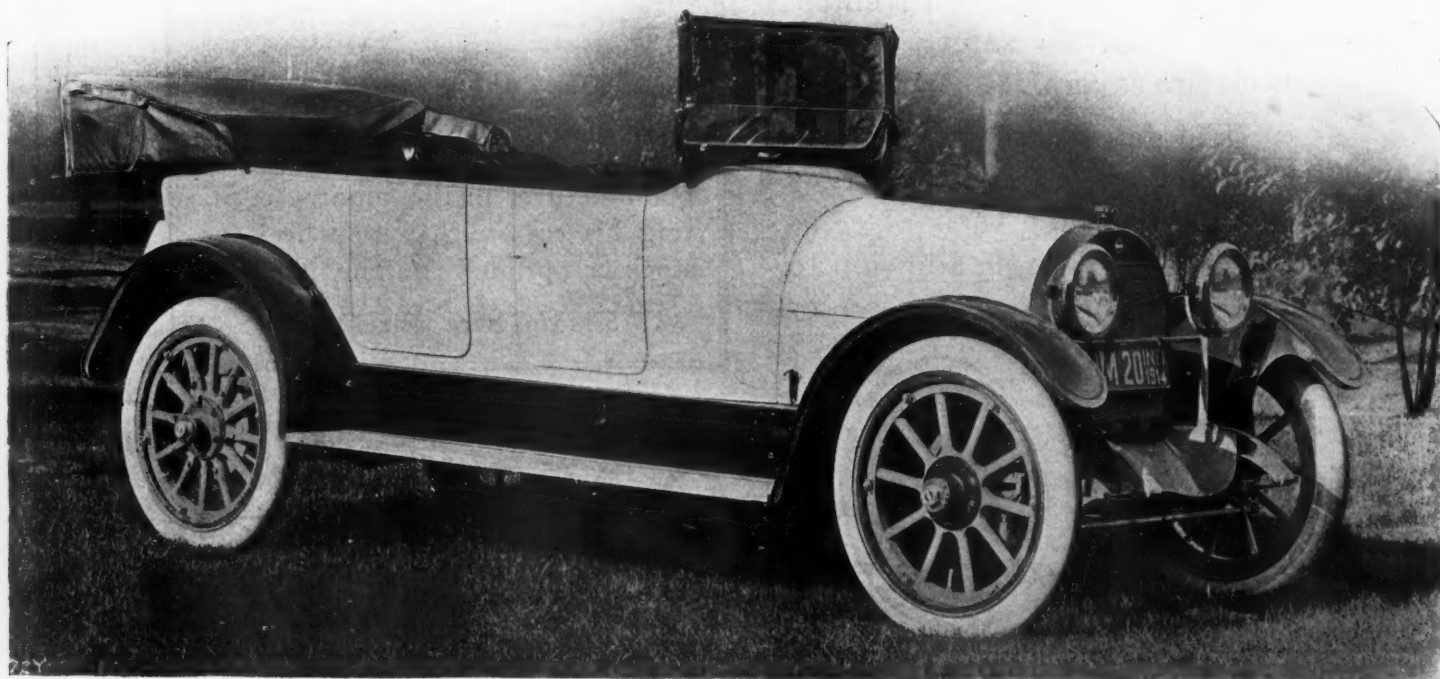
The delightful, smooth running qualities of this car are so pronounced as to arouse the instant comment of every experienced motorist who rides or drives this car. The Lexington Thoroughbred starts silently, runs silently at all speeds and takes the humps and bumps of the road with the easy, pleasant swing that proves the perfect harmony of springs and frame that is possible only in a quality car.

We know how good this car is, by the quality of the materials and the workmanship in it—every item of construction down to the

smallest bolt, rivet, and cotter pin is a quality article.

And back of it all is the master hand in engineering and designing—men who have designed and built automobiles that have brought the highest prices ever paid for American motor cars, have employed their talents in producing this superb car at a popular price.

The Lexington Thoroughbred Six looks as well as it runs, and both in appearance and running qualities it stands right up in the front rank of highest class American motor car productions that sell at double the price and more.



*When Writing to Advertisers, Please Mention Motor Age.*

# Thoroughbred Six

**The Lexington Thoroughbred Six  
Is That "Better Car"**

Better in quality of material  
Better in quality of engineering  
Better in enduring performance  
Better in appearance and style

in quality of construction  
in quality of workmanship  
in lessened liability to accident  
in lowered cost of maintenance

The price is \$1875, and worth more.

## To Representative Automobile Dealers

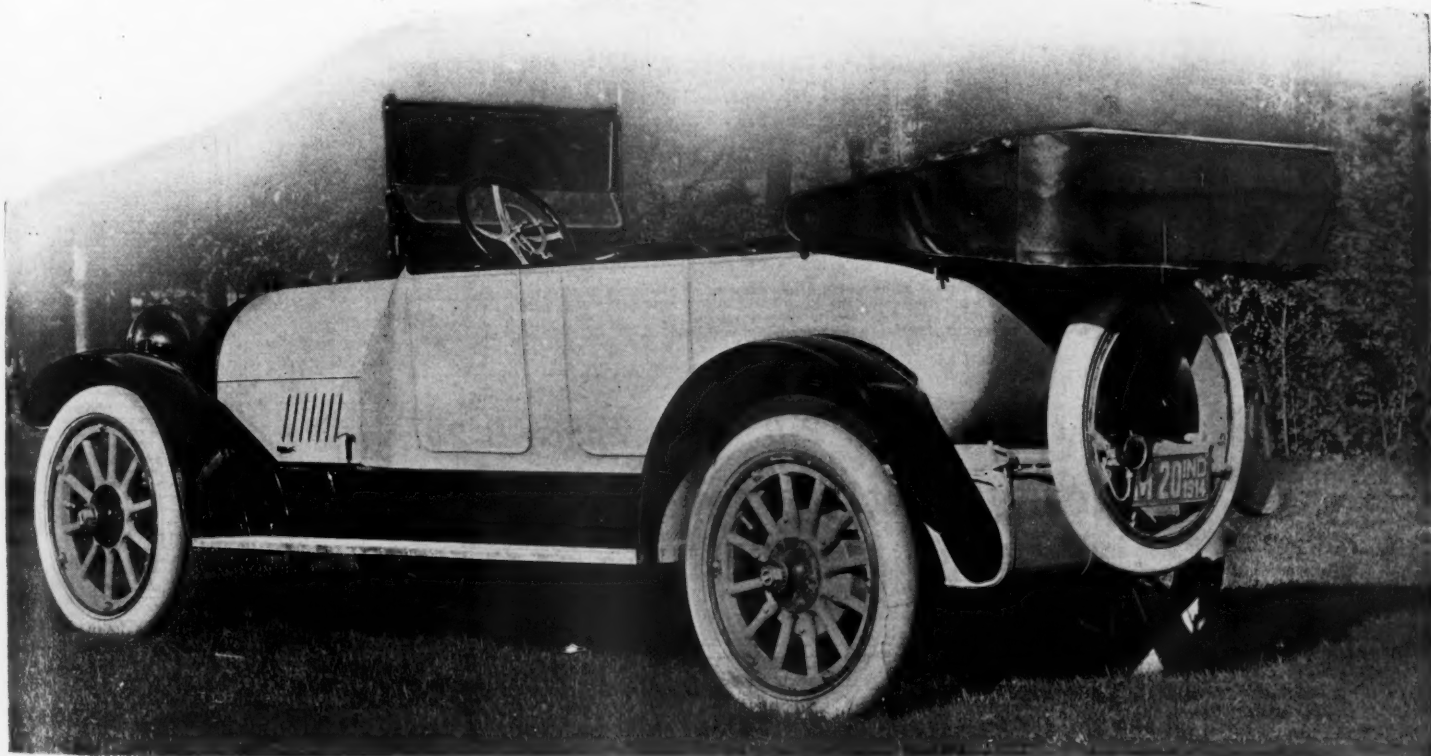
If you can market a high grade car at a popular price, a car that you can stand back of every minute and which will pay you a proper profit for proper representation and distribution, then correspond with us.

## THE LEXINGTON-HOWARD CO.

Eighteenth Street, West

See our exhibit at the Chicago Show,  
Space E-5 and 6, Armory Bldg.

Connersville, Indiana, U. S. A.

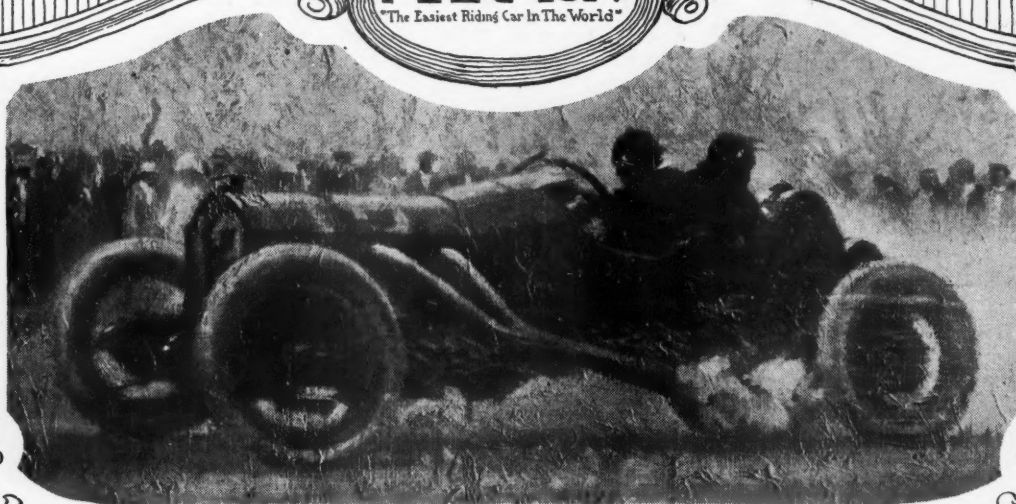


*When Writing to Advertisers, Please Mention Motor Age.*



**MARMON**

The Easiest Riding Car in The World



*From an oil painting by George Brehm showing the Marmon winning one of its world-famous racing victories.*

Because Marmon cars have won many of the world's greatest racing victories, including the first International 500-Mile Sweepstakes race—

Because Marmon still holds more official A. A. A. records than any other make of car—

Because Marmon cars have made wonderful records in daily service of 50,000, 100,000, even 200,000 miles—

Because of Nordyke & Marmon Company, founded over sixty years ago, and its records as leaders in design and manufacturing methods—

Because of all that Marmon means, you must expect great things of the latest Marmon—"Forty One."

Dealers who appreciate the value of dealing with the man whose position entitles him to demand the best, will know the value of dealing with an established manufacturer, selling a product with value proved.

**New York, Jan. 2-9.**

**Space B-24.**

**Nordyke & Marmon Company**

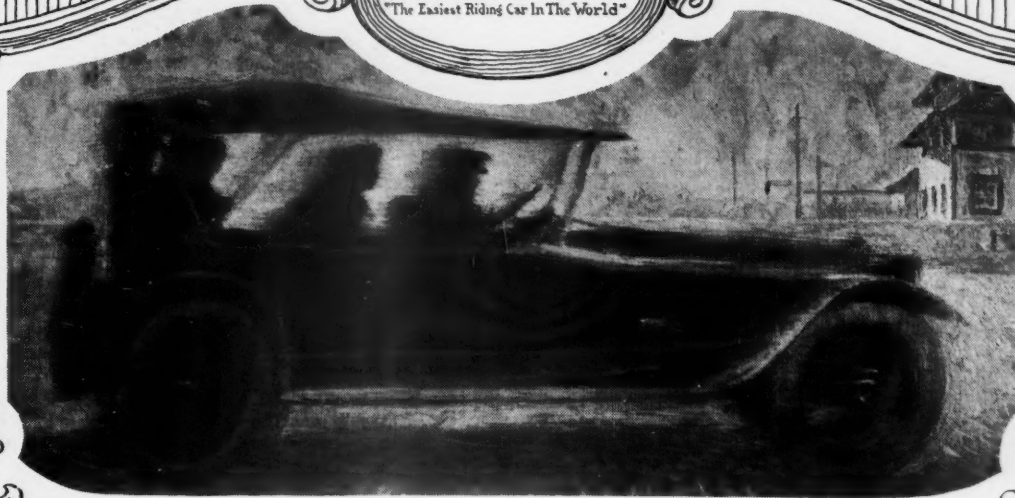
**Indianapolis**

**(Est. 1851)**

**Indiana**

**"Over Sixty Years of Successful Manufacturing"**

*When Writing to Advertisers, Please Mention Motor Age.*

**MARMON***"The Easiest Riding Car In The World"*

*From an oil painting by H. E. Summers, showing Marmon "41" stock touring car making hour record of 62.89 miles.*

Because of proofs by performance—the strongest and most final evidence of absolute value—

Because of the official hour record of the Marmon "41" stock touring car—the 1030 mile record of this same car—the record from Boston through the White Mountains sealed in high gear—the climb of Mount Hamilton to Lick Observatory—the records of Marmon "41" in all parts of the country which no other touring car has ever equaled—

Because of these actual demonstrations of its unequaled design, materials and construction, you must admit Marmon "Forty-one" is up to the Marmon standard of "the best."

And because we guarantee to equal any of these tests with the Marmon "41" you buy of us (see "Proofs by Performance") you have only to choose your test of value and say—"Prove it."

The Marmon dealer is in position to put up the strongest selling argument ever advanced to the buyer of a high class car. And he is also enabled to back up that argument with actual proof by performance. Investigate.

**Chicago, Jan. 23-30.**

**Space H-2.**

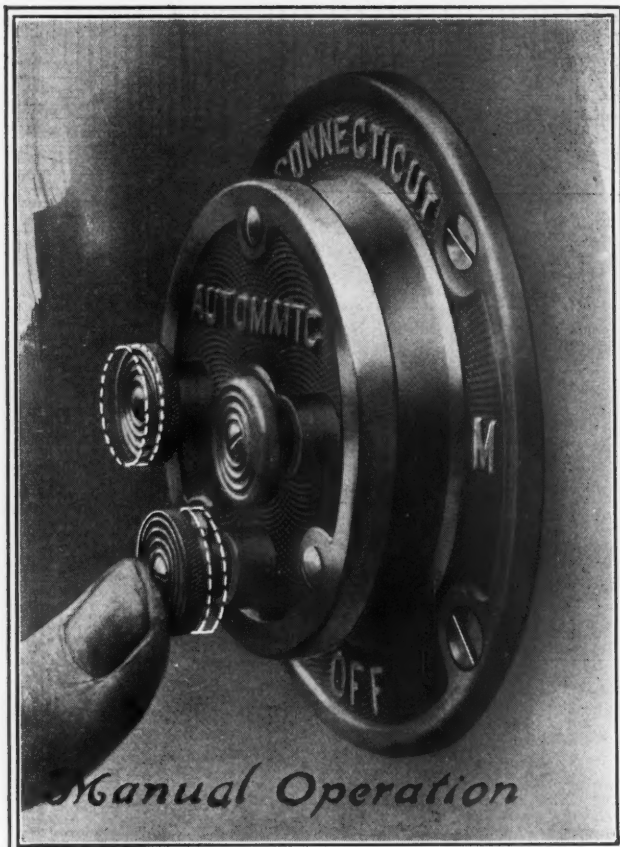
**Nordyke & Marmon Company**

**Indianapolis**

**(Est. 1851)**

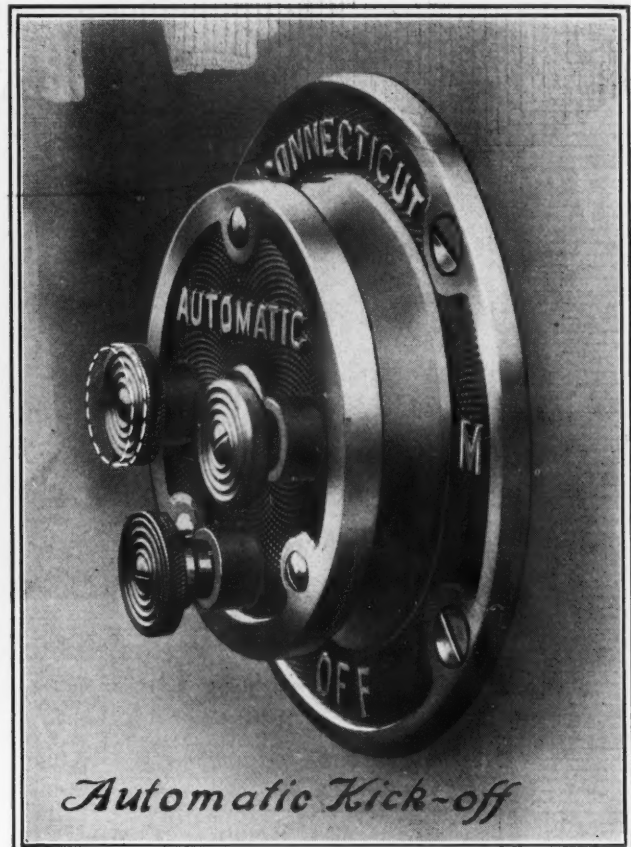
**Indiana**

**"Over Sixty Years of Successful Manufacturing"**



*Manual Operation*

Connecticut Automatic Switch may be operated by hand like any other control switch.



*Automatic Kick-off*

Should the driver forget or neglect the ignition, the Switch kicks it off automatically

## *The Effectiveness of*

# CONNECTICUT AUTOMATIC IGNITION is possible because of the Automatic Switch

The Automatic Switch is the keystone in the structure of Connecticut Automatic Ignition. It is a feature individual to this system and unique in ignition apparatus.

Any system of battery ignition, designed with a closed primary circuit, is superior to the magneto on low speeds. To maintain its superiority on high speeds such a system must be designed to secure thorough saturation of the coil.

In every case but one thorough saturation of the coil of a closed circuit system is attended by the danger of battery drainage, and this contingency has been a stumbling block to ignition manufacturers who have attempted to design similar systems.

This contingency is no menace whatever in CONNECTICUT AUTOMATIC IGNITION because of its AUTOMATIC SWITCH.

The function of the Connecticut Automatic Switch is to "kick off" the current should the primary circuit be closed for an unwarranted length of time, as when the driver upon stopping his engine forgets or neglects to switch off the ignition current. The Automatic Switch also protects the ignition wiring should a disarrangement occur in the lighting or starting circuit. The principle upon which the Connecticut Automatic Switch operates is simple. The "kick off" is accomplished thermostatically by a mechanism

ism which has been employed successfully for many years in Connecticut Telephone Switches.

The switch is no more complicated than an ordinary electric bell and will operate indefinitely without any attention whatever.

In all the years we have had the mechanism of this switch in use, it has never failed its purpose.

It is more than human—it never forgets.

**CONNECTICUT** TELEPHONE and ELECTRIC **COMPANY, Inc., Meriden, Conn.**

When Writing to Advertisers, Please Mention Motor Age.





Six Passenger Touring Car  
4-Cylinder, \$2275 6-Cylinder, \$2400

## Solid as a Rock

1. The car you should buy—  
The car you should sell—  
Ought to come from a reliable  
manufacturer.



2. How about the organization back of the Stutz?
3. No bonds outstand against it and there never have been any—
4. No heavy interest on past indebtedness—
5. No heavy experimental expenses—
6. Overhead smaller than any concern manufacturing cars in the Stutz quality class—
7. A successful company from the day it built its first car—
8. Dealers' permanent success is dependent on stability of company back of a car they handle—
9. Owners are equally interested in this particular—
10. The Stutz Motor Car Company, like its car—is solid as a rock.

### 4-Cylinder Models

\$2000 Bearcat  
\$2000 Roadster  
\$2250 Bulldog  
\$3675 Sedan

### 6-Cylinder Models

\$2125 Bearcat  
\$2125 Roadster  
\$3800 Sedan

Write for Catalog

**Stutz Motor Car Company**  
Indianapolis, Indiana

**EXTRA!**

Value for \$1000.

**"C-5"****First Regiment  
Armory  
CHICAGO**

# Inter-State BULLETIN

**DEALERS!****The Chicago  
Show affords  
the best oppor-  
tunity for you  
to get our  
proposition.**

Volume 1

Muncie, Indiana, January 7, 1915

Bulletin 7

## INTER-STATE SETS NEW STANDARD

### New York Show Proves Success of Thousand Dollar Car— Pioneer in Field at a Fixed Price

### General Manager Asserts New Car Rep- resents Practical Selling Features Buyer Wants

A big fact that was demonstrated at the New York Show was the new standard set by the \$1,000 Inter-State Four in maintaining a fixed price.

Operating one of the best equipped plants in the United States and backed by ample capital to act upon a definite policy in this regard, the Inter-State Motor Company found that dealers were deeply impressed with this policy of fixing the price.

The idea of establishing a price and maintaining it means much to the dealer who appreciates the value of being able to buy the highest quality without making the buyer lose money or be extravagant in his purchase.

The company is highly pleased with the attitude taken by the trade in regard to their price policy and feel justified in taking this action.

The new Inter-State will be exhibited in Chicago Armory, where western dealers will have a splendid opportunity to see this wonderful new car.

The manner in which the new Inter-State was received by the visiting dealers and buyers at the New York Show is highly pleasing to B. W. Twyman, General Manager of the company.

man, General Manager of the company.

"We have proved beyond a doubt that our new product is logically correct and possesses the practical selling features that the dealer needs and the buyer wants.

"The business we have so far contracted means a wonderfully busy season for our concern.

"We will keep our price fixed and not reduce or raise it in the future. The only changes we will ever make will be in the car itself, but only when we can increase the quality of our car at the same fixed price.

"I am more than ever certain that a large majority of buyers are not looking for a cheap car, but one, at a price, that represents the quality we offer in our car."

**Our Chicago Show Space Is****"C-5"****First Regiment Armory**

If you do not come to the Show write us  
today for detail information  
and new circular

**INTER-STATE MOTOR CO.**

802 W. Willard St.

Muncie, Ind.

## EDITORIAL

### Why \$1000?

**Less—Means An  
Inefficient Product****More—Means An  
Extravagant Buy**

"In my personal talk to dealers I wish to impress upon you the value of making connections with a company that builds a car at a fixed price.

"Why have we selected \$1,000 as the price of our car? Consider this.

"The buyer today wants in his car, Power, Comfort and Beauty. For years I have studied all makes of cars. For years I have made it a special point to ascertain just what the buyer wants, and I find it is these three qualities.

"For one thousand dollars we give in our car Power, Comfort and Beauty. Our manufacturing methods, our ample capital and buying power make it possible for us to do so.

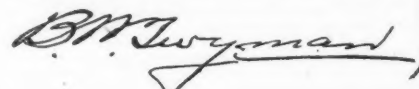
"There are good cars below this price, but my experience has been that for many reasons it is impossible for the makers to give all three of these fundamental qualities in a car below one thousand dollars.

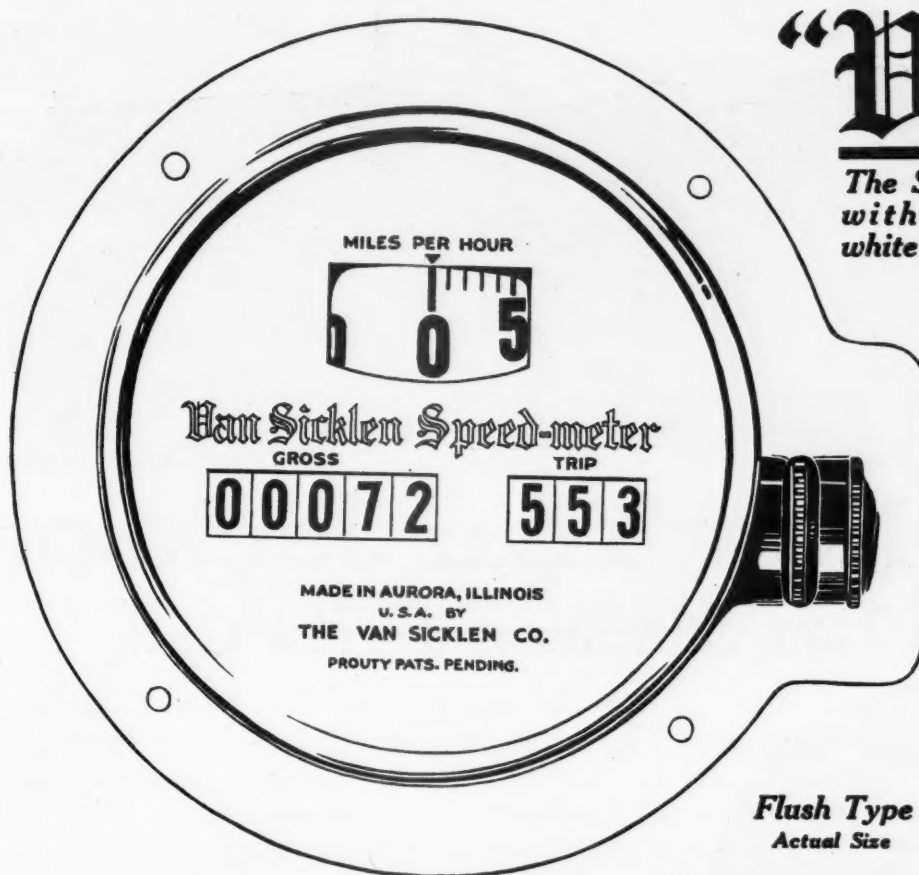
"A car to be absolutely efficient must contain all this quality. A car below our price means an inefficient product because of a lack of one of the other of these qualities.

"Power, Comfort and Beauty can be purchased in cars above one thousand dollars, but remember this—the manufacturer must add to his car extravagant details of equipment and finish, to justify the price, that are not essential or necessary to the buyer.

"It is in this new Inter-State that you will find the logical car for you to handle because the buyer will see at a glance that our claim of Power, Comfort and Beauty are actualities.

"The Chicago show affords the best opportunity for you to study this car, backed by one of the biggest and best organizations in the United States."





# "Van"

*The Speed-meter  
with the big  
white face - -*

*Flush Type  
Actual Size*

Van combines the brains of a surveying instrument with the accuracy of an adding machine. 5,280 feet equal one mile, that's the lesson he learned at the factory. He'll start in reciting it for you the first foot your car travels. He counts every foot in a mile once

Not what has been put in, but what has been left out makes Van a marvel of accuracy. Van boasts a wonderfully simple construction whose operation is based upon the infallible accuracy of a steady flowing current of air.

Van has a 100,000-mile season and 100-mile trip odometer which can be reset ten times faster than other types.

Van is made in three models—flush type for cowl-board installation, bracket type and special Ford type.

Van is fully guaranteed in every particular. Prices and full information sent on postal request.

Van made a host of friends at the New York Show. Don't fail to meet him at Chicago, January 23-30, Coliseum Gallery, Space 92.

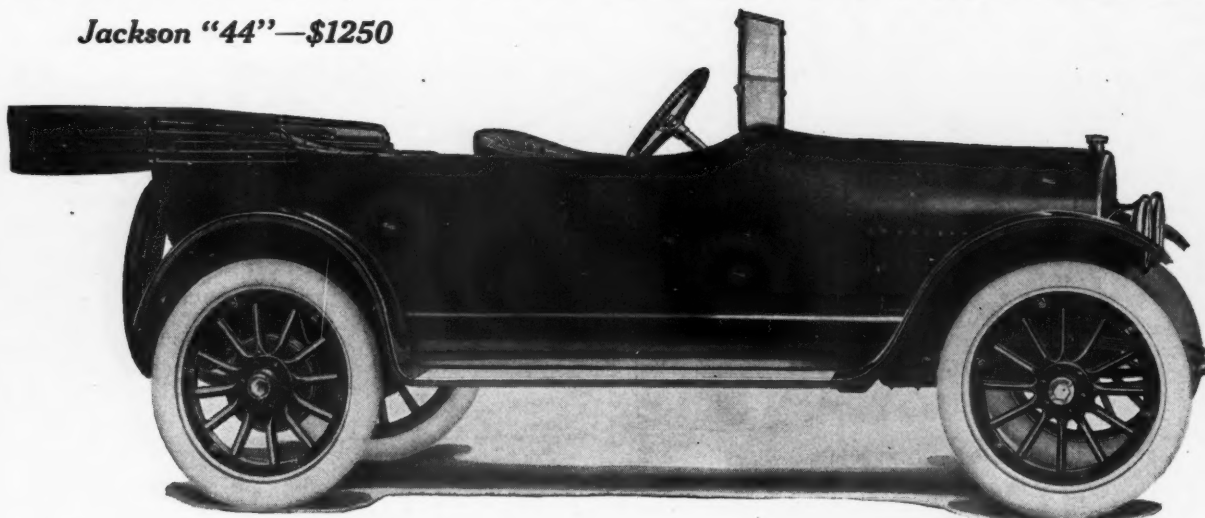
## THE VAN SICKLEN COMPANY

AURORA ILLINOIS

Central States Distributors: The Beckley-Ralston Company, Chicago  
T. T. Roe, 847 Golden Gate Ave., San Francisco, California, Western Representative



Jackson "44"—\$1250



## The New Year Jackson

### Old Time Sturdiness in New Garb



*Thousands of Jacksons six, seven and eight years old are still giving faithful service every day.*

#### SPECIFICATIONS

Model "44"—\$1250

**BODY**—Full streamline body, curved back, flush doors, concealed hinges, crowned fenders. **POWER PLANT**—Long stroke four-cylinder motor, 40 H. P., Auto-Lite electric cranking, lighting and ignition system. **FUEL SUPPLY**—Gasoline tank at the rear. Vacuum feed. **CONTROL**—Steering wheel on left side, control levers in the center. Either front door may be used. **SUSPENSION**—Full elliptic springs front and rear. Underslung in rear. **REAR AXLE**—Floating type. Two universal joints. **WHEEL BASE**—115 inch. **TREAD**—56 inch. **TIRES**—34 x 4 inch. **FINISH**—Brewster Green. For special colors an additional charge of \$25 will be made.

**EQUIPMENT**—One man rubber top, top hood, two-piece rain-vision windshield, speedometer, electric light on instrument board, sight-feed oil gauge, demountable rims, extra rim, tire carrier at rear, foot rail, coat rail, pump, tools and jack, electric lights and electric horn.

AT the opening of the New York show, when the Model "44" was first given to the trade, Jackson dealers placed orders far in excess of our plans. They told us that this was the car their prospects had been waiting for—that it filled the exact requirements they had laid down.

They told us that their trade demanded the durability and the mechanical perfection that the Jackson has always had—that they wanted a car a little smaller and a little lighter—but most of all they wanted a car whose body lines should be the last word of the carriage builder's art and whose appointments and details of finish should be beyond criticism. And all this, they said, at a price not to exceed \$1250. Their customers, so they told us, were demanding more than ever before, a car of distinguished appearance and perfect finish at a moderate cost.

And so the Model "44" has taken its rightful place, has met with a degree of enthusiasm in our organization beyond our fondest hopes. The "44" has the old-time Jackson sturdiness, it has the durability which only mechanical goodness can give, and above all it has a full streamline body which is the equal, in style and symmetry, of the highest-priced cars on the market.

All the refinements are complete—flush doors, concealed hinges, one man top, two piece rain-vision windshield, crowned fenders and rounded radiator front. Ignition and lighting switches, speedometer, ammeter and oil gauge are all grouped on a metal instrument plate in the center of the dash, all illuminated by one dash light.

Our dealers tell us that the "44" will bring us the biggest business in our history, and they are backing up their congratulations with big orders to cover the requirements of their own territories.

The "44" will be exhibited at the Chicago Show, Space J-1 in the Coliseum. We want you to see it. In the meantime, write or wire us for complete specifications and description

**Jackson Automobile Company, 1207 E. Main Street, Jackson, Mich.**



## How Much Does It Cost You to Be Without Snubbers?



As car springs compress, the slack in belting is drawn into the coil. As springs start to expand, the layers of belting tighten on brass friction band within the coil, causing a friction that prevents abrupt or excessive expansion of the springs.

PRICE: \$15, \$20 and \$25 per set of four, two front and two rear. Half that per pair.

EVERY TIME the car is slowed down for a cross-walk or a rough spot, how much does it cost in wear and tear on tires, brakes and mechanism; and how much does it cost in gasoline and tires to speed up again ?

HOW MUCH is it worth in added comfort and satisfaction to ride smoothly and steadily without the discomfort and exertion of slowing down and speeding up again at every rough place ?

SEND FOR CATALOG

Gabriel Horn Mfg. Co., 1415 East 40th Street, Cleveland, Ohio

# GABRIEL SNUBBERS

*When Writing to Advertisers, Please Mention Motor Age.*

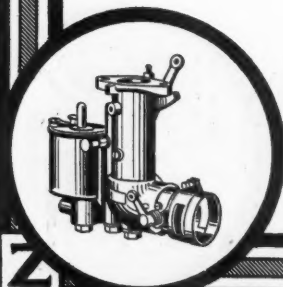
# DOMINANCE

In the well known English automobile paper, the Autocar, of November 14th, 1914, is printed a description of all the motor cars represented in England. They total 558 chassis, not confined to English makes, but including importations.

Of the 558 cars listed, 124 have their own carburetor and 46 are given as blank or unknown. This leaves a total of 388 cars carrying carburetors made by specialists. Note the result.

|            |              |
|------------|--------------|
| Zenith 241 | or 62.14%    |
| A          | 39 or 10.05% |
| B          | 24 or 6.21%  |
| C          | 15 or 3.86%  |

The Zenith carburetor leads its nearest rival by six times the number of cars equipped. Enough said. The Zenith is now made in America for your service and satisfaction.



**ZENITH CARBURETOR CO.**  
DETROIT, U.S.A.







**Chassis Only  
\$1400**

**Complete  
\$1500**



Model B. 1 Ton Capacity  
With Express or Stake Body

# "The MENOMINEE" TRUCKS

FOR ECONOMY

## WHY "FOR ECONOMY?"

—Because MENOMINEE MOTOR TRUCKS can deliver three times as many packages, in a given time, as a team.

MENOMINEE MOTOR TRUCKS can deliver three times as fast. And they never tire out.

MENOMINEE TRUCK OWNERS can handle three times as much business and as many customers, with practically no increase in cost.

That's why. "For Economy."

## HERE IS VARIETY

**Model A-3 1500-pound capacity Chassis \$1125—Complete with Express or Stake Body \$1200.**

**Model B-3 2000-pound capacity Chassis \$1400—Complete with Express or Stake Body \$1500.**

**Model C 3000-pound capacity Chassis \$1800—  
Complete with Express or Stake Body \$1950**

*Consider the low prices and the wide range of service these various models cover*

**Dealers**—Who handle MENOMINEE TRUCKS have the equivalent of three separate and distinct lines. A truck for any degree of service—a truck at any price.

And we assist our dealers by a co-operative sales plan. Write for details. Use attached coupon, and mail it to us today.

**D. F. POYER COMPANY**  
Menominee, Mich.



**(COUPON)**  
D. F. POYER CO., Menominee, Mich.  
Gentlemen:  
I am interested in "The MENOMINEE" Motor Truck.  
Kindly send me complete information.  
Name .....  
Address .....  
If a dealer check here ☐

42-  
Six

# KISSELKAR

Every Inch a Car

42-  
Six

## Better than the average six at lower than the average price

**T**HE KisselKar 42-Six is winning laurels at the New York Show. It is one of the few cars exhibited there that possesses marked individuality.

Its exclusive engine, axles, clutch, starter and other vital parts—its smart body designs offered with no other car—these things considered with its price attracted to it unusual attention.

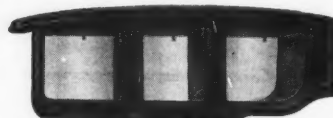
The 42-Six and all KisselKar chassis models are to be had with either the conventional four-door and roadster bodies or the original Kissel One Compartment body with two doors and individual forward seats.

### The Detachable Sedan Top

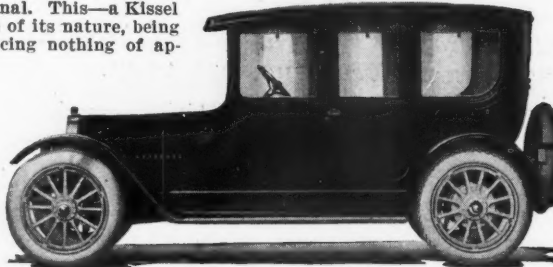
The one great practical novelty of the year—the *Detachable Sedan Top* for winter driving—may be obtained with the One Compartment two-door cars for \$350 additional. This—a Kissel innovation—is distinct from any other device of its nature, being built in—not merely set on—and thus sacrificing nothing of appearance, style or comfort.

The \$1650 42-Six will be exhibited at the Chicago Show, together with the balance of the KisselKar line, including the best Four in America—the KisselKar 36-Four at \$1450.

Write for literature on the new KisselKars and check up the specifications with other approximately priced cars.



The Detachable Sedan Top



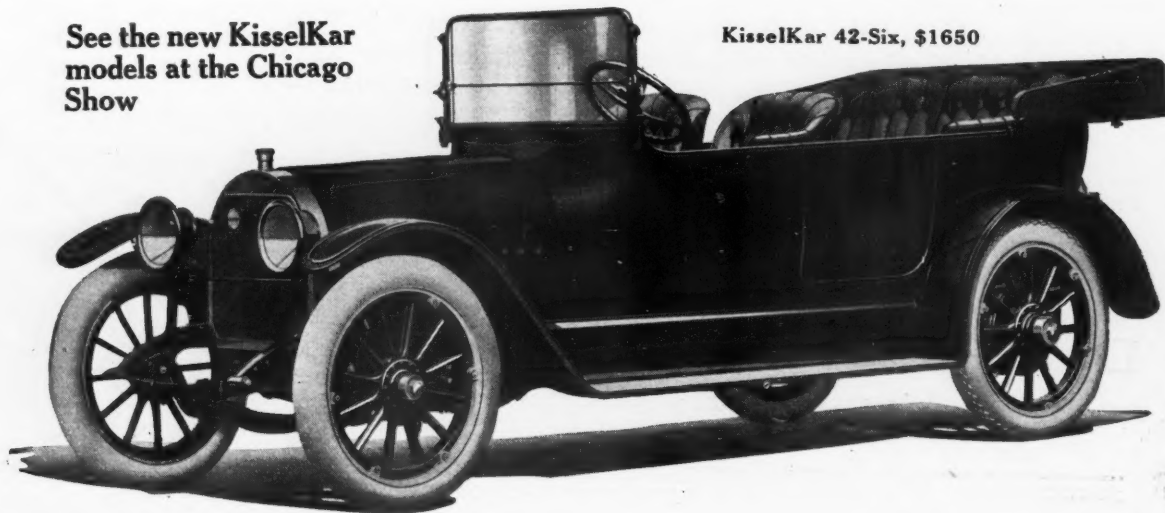
### KISSEL MOTOR CAR CO.,

121 Kissel Ave., Hartford, Wis.

New York, Boston, Chicago, Philadelphia, St. Louis, Milwaukee, Minneapolis, St. Paul, Dallas, San Francisco, Los Angeles, Oakland, Omaha, Cleveland, Detroit, Toledo, Columbus, Buffalo, Rochester, Baltimore, Pittsburgh, Worcester, Duluth, Seattle, New Orleans, Nashville, Hartford, Conn.; New Haven, Troy, Norfolk, Providence, Marshalltown, Ia.; Madison, Montreal, Toronto, Calgary, Victoria and 300 other principal points in the United States and Canada.

See the new KisselKar  
models at the Chicago  
Show

KisselKar 42-Six, \$1650



When Writing to Advertisers, Please Mention Motor Age.

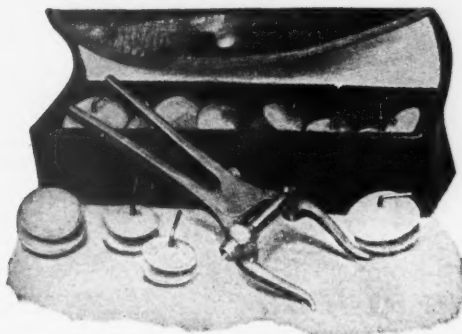


# Sampson Repair Plug



**For Automobile Inner Tubes** The Quickest Permanent Repair Ever Devised

**Requires  
No Cement  
No Cleaning  
No Gasoline  
Just the Bare  
Hands**



**Has Been Tested  
To the Limit  
and  
Never Found  
Wanting**

**The Sampson Repair Kit**

**Motorists Who Drive Your Own Cars**

**You Chauffeurs Whose Employers Value Economy**

**At the New York and Chicago Auto Shows**

**See the New SAMPSON REPAIR KIT For Automobile Inner Tubes**

This season's big feature in the automobile world—an instant roadside repair, as good as a shop could make it—as secure as



**Making a clean hole of the puncture**

vulcanizing—will last as long as the tube. No cement—no gasoline—no cleaning—no waiting—nothing but the bare hands needed.



**Distending hole to insert plug**

Sounds interesting, doesn't it? The repair is made immediately and permanently. It will positively cure a puncture and keep it cured. The Sampson Plug incorporates no radical departure from old established tire practice. It is merely the combination of old elements in a new original manner. It is not to be confused with any other plug ever made or marketed. It uses screw-pressure—which is the means used in making tight the valve stem in the tube—with soft rubber contact surfaces for the flexibility necessary and with feathering edges to present a smooth cylindrical surface to the casing.

There is no marvel in its holding and wearing, it has to do so. It positively cannot bite through the tube, but actually reinforces it, and also reinforces the shoe at the point of puncture—staving off the blowout which frequently results.

You simply punch a hole where the puncture has occurred, with



**Breaking off wire—repair completed**

the punch furnished with the kit; then insert the plug, screw it up tight with the fingers, break off the wire, and you are ready for travel, with a clean, permanent job. The further you run, the better the repair becomes, until finally the plug is in reality a part of the tube itself.

Sampson Repair Kit, containing Tool and 1 Doz. Assorted Plugs.....**\$2.50**  
Sampson Repair Carton, containing Tool, ½ Doz. Assorted Plugs.....**\$1.50**

Sampson Repair Plugs, Per Doz., \$1.75  
Sampson Repair Tool .50

**STEVENS & CO.,**

**373 BROADWAY, NEW YORK**



## A demountable top is more desirable than two complete bodies

The logical solution of the Winter car problem is found in the Pathfinder "Quick Demountable" Limousine Top.

With this body one car serves admirably for both Summer and Winter use; a fine open touring car in summer, and a beautiful, luxurious limousine in winter. As the lines of the car, its finish and appointments, are beyond criticism, no one would suspect that it was a two-purpose car.

The change of tops is easily made, without expert labor—without even disturbing the elaborate electric wiring now in use.

The body complete is lighter than a limousine, and so good looking and comfortable that women, as well as men, are delighted with it. It is the most practical idea developed in automobile body work for several seasons.

*Another advantage for dealers who handle the*

## PATHFINDER

Dealers, you can sell Pathfinder cars freely. This "Quick Demountable" top is only another feature which creates demand.

Imagine yourself demonstrating a Pathfinder to a man and wife, who are prospects. You go over the machine with care, pointing out the almost innumerable ways in which its superiority is clear.

They know the Pathfinder reputation well, they already have a favorable impression of the car. As you proceed, their enthusiasm for the Pathfinder increases until, as you tell them about the "Quick

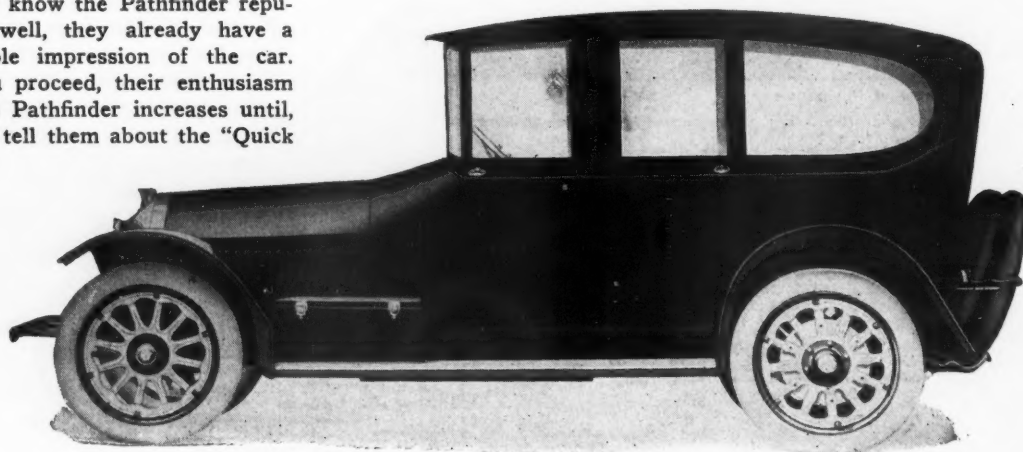
Demountable" top, they are completely won.

Never have they seen an automobile idea so needed and so perfectly worked out. You make the sale.

It is easy to sell Pathfinders and Pathfinder trade is the best class of trade. It brings substantial profits.

If you haven't carefully considered the possibility for profitable dealing in Pathfinder cars, greater now than ever before, you should do so immediately. In no other field is there so little competition and in none a more steady demand.

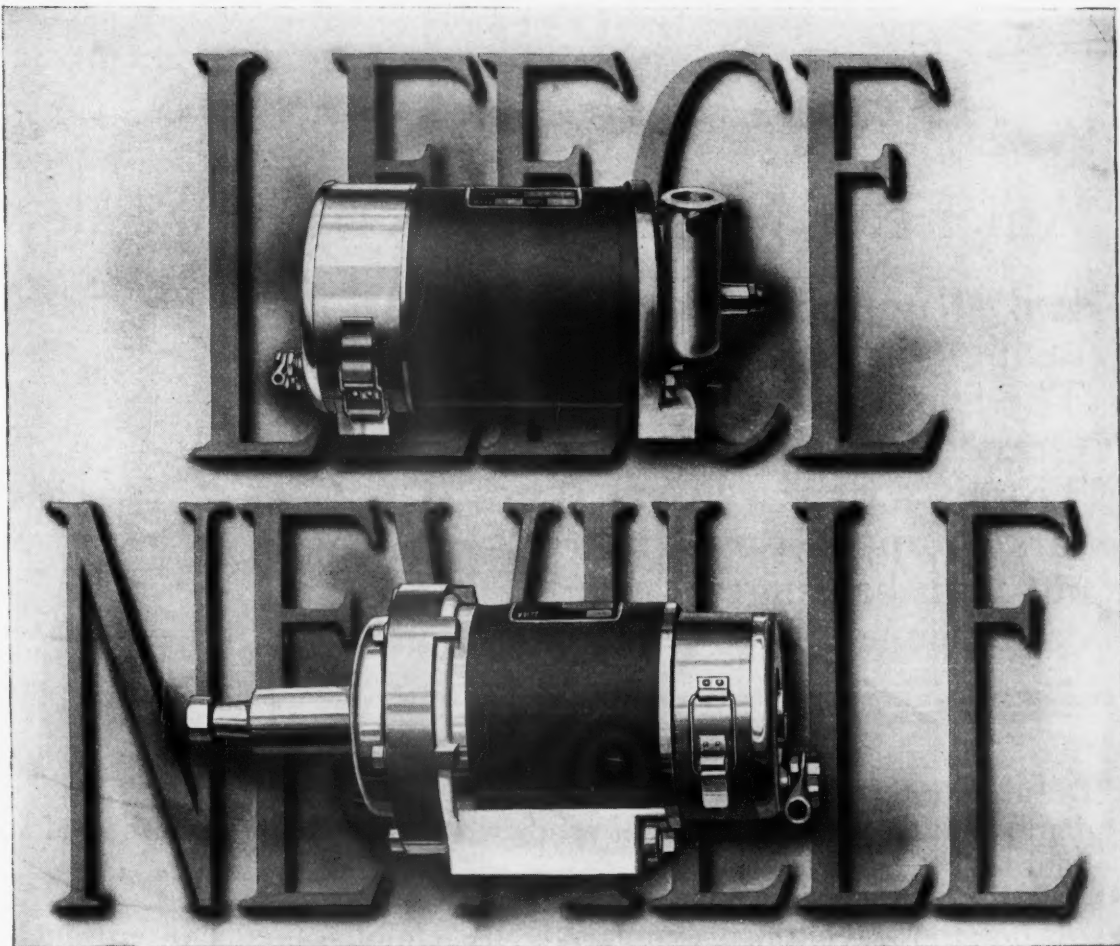
We will make some interesting suggestions to you along these lines, if you like.



Pathfinder Daniel Boone Model Touring Car, equipped with demountable top

**The Motor Mfg. Company,** 1132 Division Street **Indianapolis, Ind.**

*At the Show you should see the*



## Electric Starting *and* Lighting System

See it in Space D-24-A  
See it on Haynes Cars  
See it on Thomas Cars

*Write us for full information*

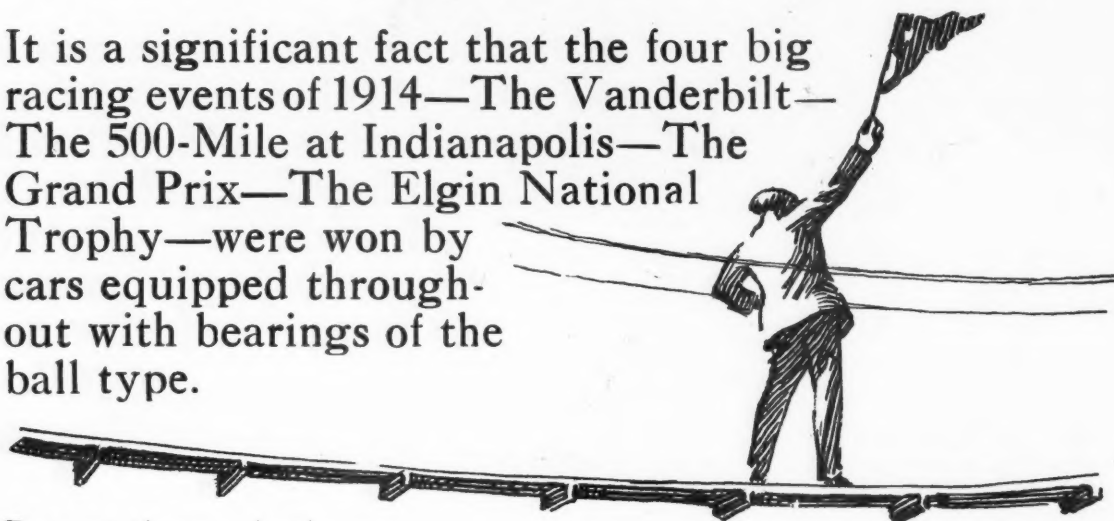
**THE LEECE-NEVILLE COMPANY**  
1051 Power Avenue, Cleveland, Ohio

(48)

# NEW DEPARTURE BALL BEARINGS

American Made for American Trade

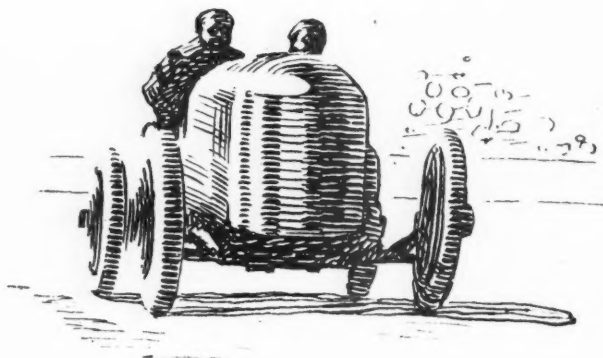
It is a significant fact that the four big racing events of 1914—The Vanderbilt—The 500-Mile at Indianapolis—The Grand Prix—The Elgin National Trophy—were won by cars equipped throughout with bearings of the ball type.



Do not these winnings demonstrate ball-bearing efficiency beyond any possibility of doubt?

Do not these winnings emphasize tremendously our contention that ball bearings should be used throughout all American made motor cars?

In New Departure Ball Bearings we offer the American Motor Car Manufacturer a guaranteed bearing, made from high carbon alloy steels, accurate in every detail and of proven quality and trustworthiness in service.



New Departures are made in four types and in sizes and quantities calculated to meet every requirement.

**The New Departure  
Mfg. Co.**

Bristol, Conn., U. S. A.  
Western Branch: 1016-17 Ford Bldg., Detroit, Mich.



# CAMPBELL GUARANTEED MOTOR CAR ACCESSORIES



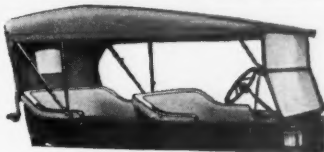
Dodge Car,  
equipped with  
Campbell  
Detachable Upholstery

## Detachable Upholstery

*Better Than Seat Covers*

Campbell offers the trade and the car owner a bold innovation in automobile accessories, Detachable Upholstery that has all the advantages of the old style seat cover with the added richness and beautiful fit of the finest plain upholstery on the highest priced cars.

Campbell Detachable Upholstery is the last word in motor luxury. Rare fabrics and colors that harmonize with every color scheme, faultless fit and wonderful durability characterize this new product of the famous house of Campbell.



Although but a few weeks old, this latest accessory has already become a remarkable factor in the motor world. Its quick detachable feature and its ease of cleaning make it a most attractive proposition to the trade and the car owner. Many fabrics, colors and prices in stock sizes to fit all popular makes and models of cars.

**One-Man - One-Hand Top** —for light cars. A real one-man top that a child can operate. Up or down in ten seconds. Genuine mohair, finest trimmings, best quality throughout. Ten second curtains and dust hood included. An excellent selling proposition.

**PERCAMA, The Heavy Fabric Cleaner** Cleans tops, upholstery, rugs, mats—all heavy fabrics that water will not injure. Safe, sure. Contains no explosive, will not injure rubber or waterproofing materials. Inexpensive to buy. Economical to use. Quart, 25c; ½ gal., 40c; gal., 60c.



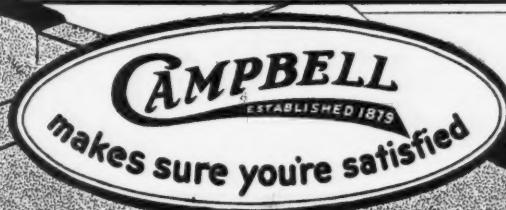
## Write for Catalog

Showing our complete line, including the latest Ford Specialties on the market, auto straps of all kinds, robes, tourists' sleeping blankets, and dozens of other accessories. Write to

**THE PERKINS-CAMPBELL CO.**  
624 Broadway, Cincinnati, Ohio

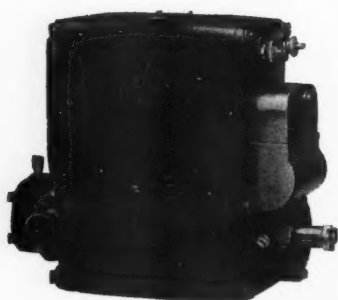
## Dealers!

We have the fairest agency plan you ever read. Get in touch with us. Address all trade correspondence to the Sales Manager.



# Westinghouse

## One-Wire Electric Systems

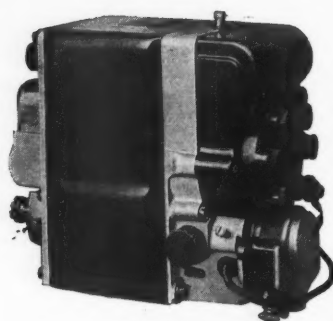


LIGHTING GENERATOR

# Ignition

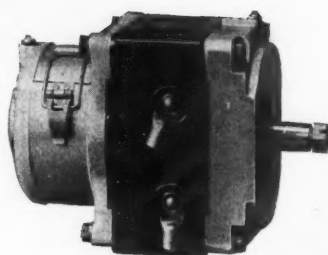
# Lighting

# Starting

IGNITION AND LIGHTING  
GENERATOR

The name back of these systems is a guarantee of the quality of the apparatus, and of the service following the sale.

Consider this list of 38 cars now using Westinghouse Electric Systems:



STARTING MOTOR

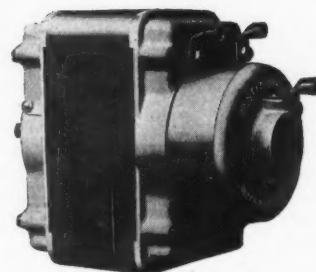
Allen  
American La  
France  
Amplex  
Atterbury  
Auburn  
Austin  
Briggs-  
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Gilde  
Halladay  
Case  
Chadwick  
Crawford  
Davis  
Dorris  
FIAT

Hupmobile  
Kissel  
Kline  
Lauth-  
Juergens  
Lenox  
Lexington-  
Howard  
Locomobile

McFarlan  
Marlon  
Moreland  
Norwalk  
Ohio  
Pathfinder  
Pierce-  
Arrow  
Pilot

Pullman  
Richard  
Seagrave  
Singer  
Speedwell  
Standard  
Stewart  
Vulcan



STARTER-LIGHTER

## Westinghouse Electric & Manufacturing Co.

Automobile  
Equipment Division



East Pittsburgh,  
Pennsylvania

January 1<sup>st</sup> 1915

# ANNOUNCING THE BEARINGS COMPANY & AMERICA

SUCCESSOR TO

J. S. BRETZ COMPANY, *NEW YORK*  
FICHTEL & SACHS, *LANCASTER, PA*  
STAR BALL RETAINER CO. *LANCASTER, PA*

*F&S ANNULAR BALL BEARINGS*  
*BALL THRUST BEARINGS*  
*STAR BALL RETAINERS*  
*BOWDEN WIRE MECHANISM*  
*GERMAN STEEL BALLS*



*Sales Department*  
250 WEST 54<sup>TH</sup> STREET  
*NEW YORK*

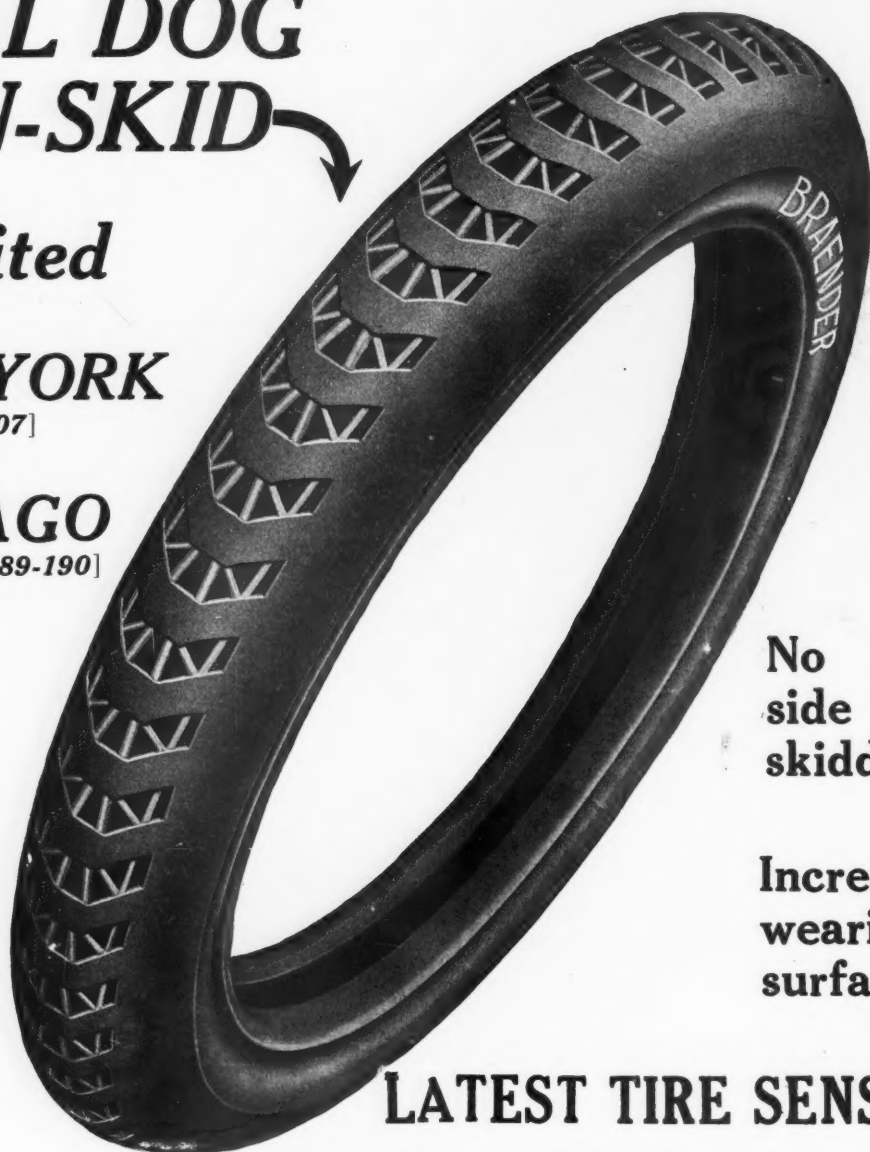




# The *NEW* BRAENDER

**BULL DOG  
NON-SKID**

*will be  
exhibited  
at the  
NEW YORK*  
[Space No. D207]  
*and  
CHICAGO*  
[Spaces Nos. 189-190]  
**Shows**



**No  
side  
skidding**

**Increased  
wearing  
surface**

**LATEST TIRE SENSATION!**

**The Fastest, Safest, Smoothest  
riding and most Durable tire made**

**BRAENDER RUBBER & TIRE COMPANY**

**250 West 54th St., New York**

**Factory RUTHERFORD, N. J.**

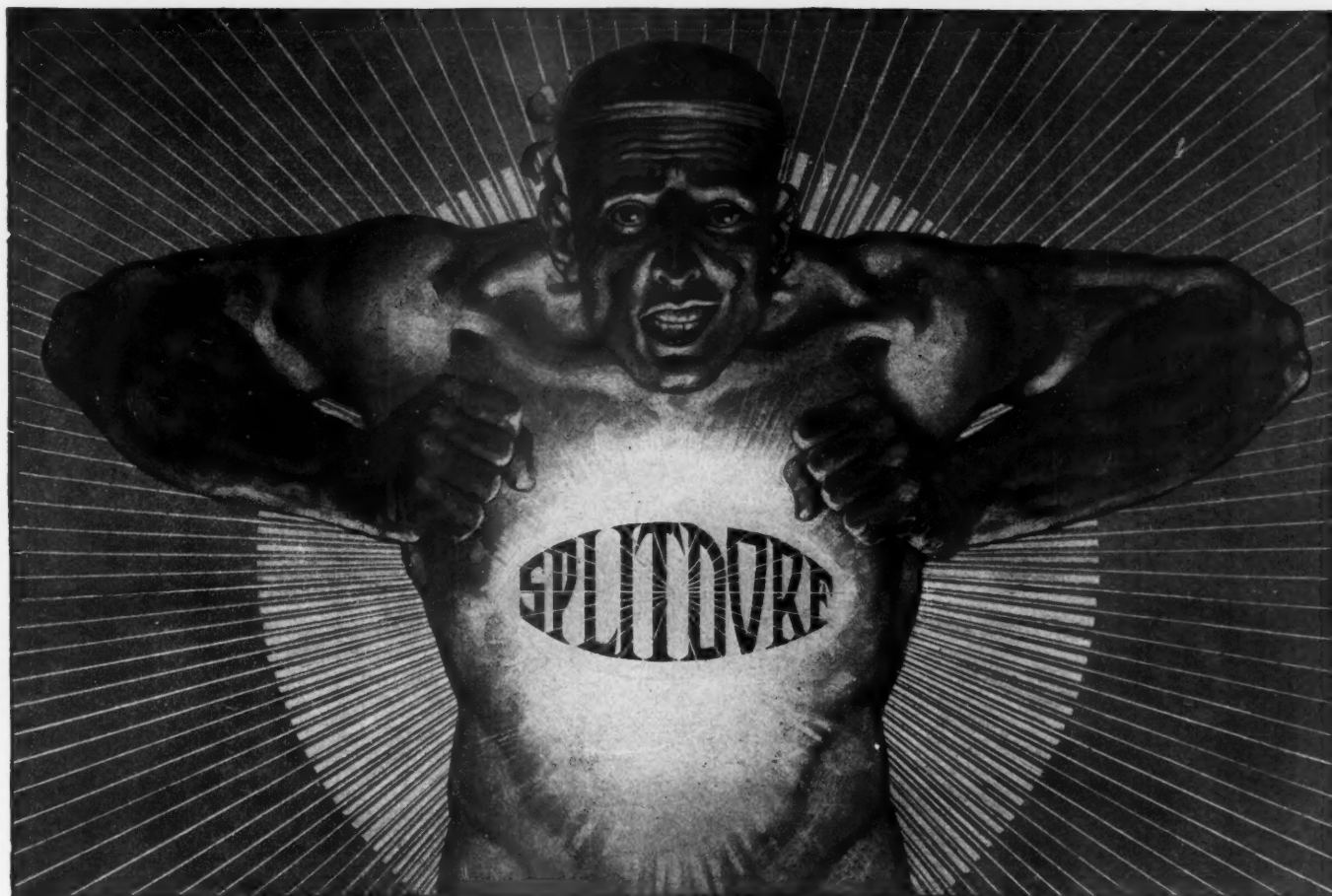
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*When Writing to Advertisers, Please Mention Motor Age.*



REG. U. S. PAT. OFFICE

# SPLITDORF-APELCO

Electric Starting and Lighting System for *Ford* Cars

## AT THE NEW YORK AUTO SHOW

"The most compact—the most serviceable for the *Ford* owner" has been the designing and manufacturing dictum, while absolute utility has been the keynote for the strenuous and exhaustive tests the system has undergone to pronounce its fitness for hard service.

In unique features of construction and application—**absolutely no machine work is necessary to make an installation**—the manufacturers of the SPLITDORF-APELCO outfits have satisfied themselves with the merits of their *Ford* Starting and Lighting unit.

EVERYTHING AN OWNER NEEDS FOR INSTALLATION, **\$85.00**

*Send or write for a fully illustrated booklet*

## SPLITDORF-APELCO DISTRIBUTING STATIONS

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LONDON

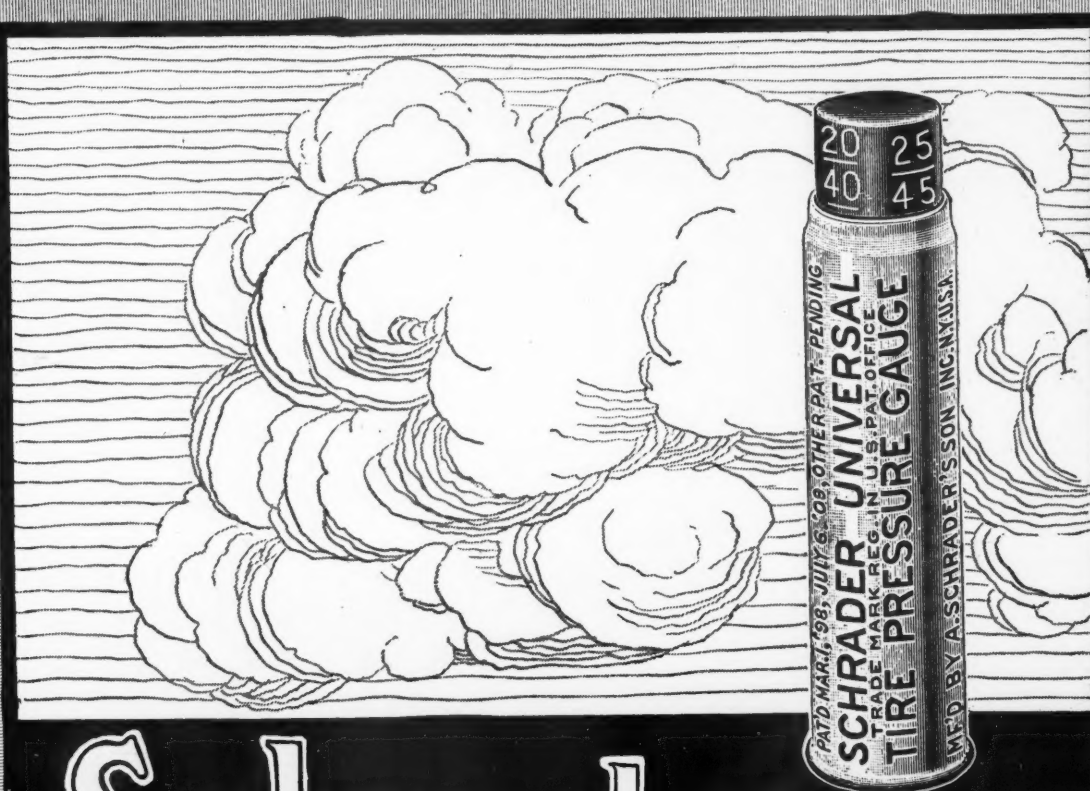
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FACTORIES: NEWARK, NEW JERSEY



# Schrader

## What's in a Name

**T**HE name SCHRADER is a guarantee of quality. The reputation which we have acquired rests upon seventy years of service to the trade and public. Since its establishment in 1864 the Schrader firm has had PERFECTION as its watchword. Take advantage of the reputation which we have made for our goods and of the demand which we have created for them.

There is no risk in stocking Schrader goods. You can sell as many Schrader gauges as there are cars in use and as many Schrader valves as there are inner tubes made.

The man who has been riding on haphazard pressure has been spending a great deal more money for tires than he need have spent. Sell him a Schrader gauge and make a friend of him.

**PRICE \$1.00**

For sale by Tire Manufacturers, Jobbers, Dealers, Garages or

**A. SCHRADER'S SON, Inc.**

783-791 Atlantic Ave. Brooklyn, N. Y.



# TIMKEN

## AXLES & BEARINGS

### More Than the Sum of Its Parts

Each piece in this rear axle represents the solution of an engineering problem—perhaps many problems—

Every axle piece *must be right* in itself. And each must be *rightly related* to all the other pieces. Because the axle as a whole *cannot* be any better than its weakest part.

Just so with the complete axle as a fundamental part of the car. It must be right in itself—and rightly co-related with the other fundamental parts of the car.

Must be—because we realize that the public rightly judges Timken Axles and Bearings by *their performance in the complete unit car*. We are building for the future.

#### Two Sets of Brains Better Than One

Designing and engineering a Timken-Detroit Axle into a particular motor car is a matter of many conferences of many men. Men who view the proposed car from widely different angles.

The men responsible for the car and the men responsible for the Timken-Detroit Axle.

Men who have the viewpoint of the engineer, of the designer, the metallurgist, the chemist, the producer, the salesman.

The bigness and multiplicity of the problems call for *all* the mental resources of an able car-building organization and an able axle organization. Load, distribution of weight, horsepower, wheel base, spring suspension, even location of tank—a hundred and one things must be considered.

Thus, in the thought given to the problems involved in every piece, in the axle as a unit, and in its relations to other parts of the car as a whole—

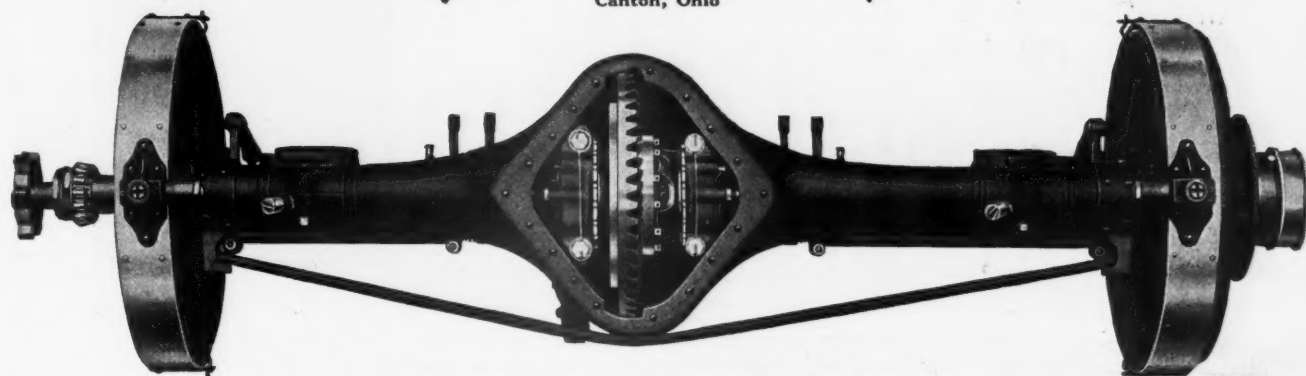
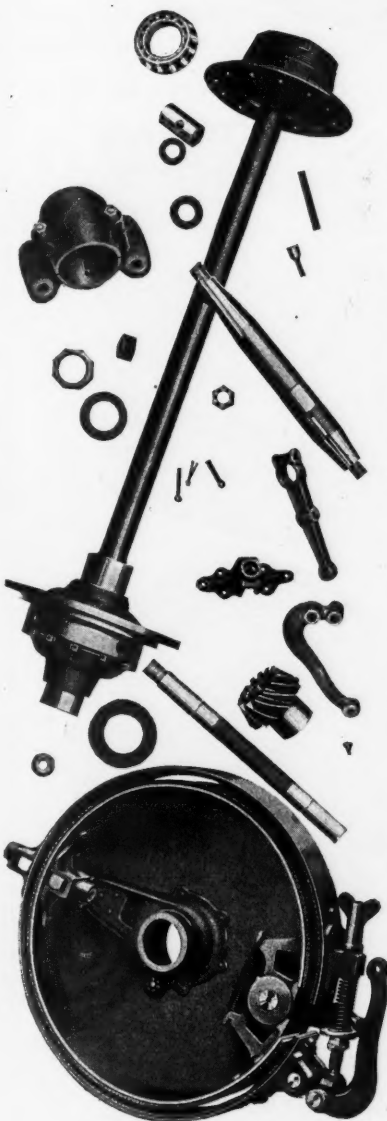
The Timken-Detroit organization assists those car builders who are making cars of substantial value to their owners—in satisfaction, in long life and in low cost of operation.

For a better idea of the importance and the construction of axles and bearings, and for the list of cars into which Timken Axles and Bearings have been engineered, write for the "Three Timken Booklets." They'll be mailed free on postcard request to Dep't T-9, either Timken Company. They will not be followed by letters or by salesmen's calls. Write today.



The Timken-Detroit Axle Company  
Detroit, Mich.

The Timken Roller Bearing Company  
Canton, Ohio



When Writing to Advertisers, Please Mention Motor Age.



**T**HE NEW NATIONAL RADIATOR upsets all precedents in radiator construction. Study the illustration for a moment and you will see why the **NATIONAL RADIATOR** gives greater strength, bigger cooling surface and uses less water than any other.

### An Entirely New Principle of Construction

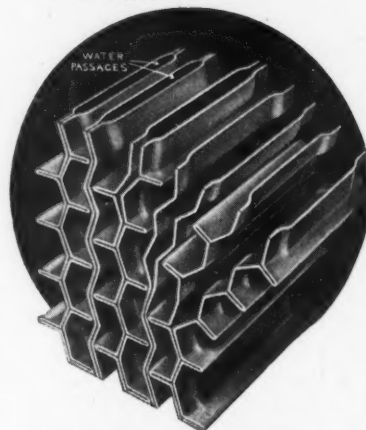
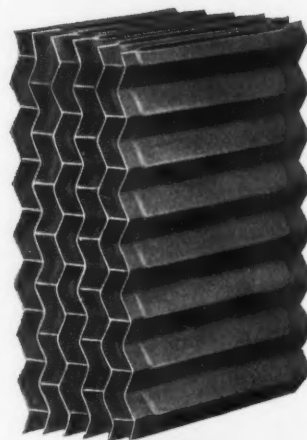
Made of continuous bands of brass, not built up cell by cell but made as a unit. Radiator leakage is not caused by rust, neither do the tubes burst from over-pressure. The continuous racking strains and jars of the road are alone responsible and surely in time cause the ordinary tubes to pull apart.

The special corrugated construction of the **NATIONAL RADIATOR** is a natural shock absorber, making the Radiator practically everlasting.

Both air and water tubes are exceptionally large, thus insuring free circulation and greatly increased cooling capacity.

All **NATIONAL RADIATORS** are tested at not less than fifteen pounds air pressure under water.

**THE NATIONAL CAN COMPANY**  
Detroit, Michigan



# HYATT QUIET BEARINGS

(Used in practically all American Motor Cars)

The spiral construction is one of several exclusive features of Hyatt Roller Bearings. This makes them—(1st) Flexible, thereby reducing noise and vibration, and insuring perfect alignment—(2nd) Self-oiling, because the right and left spirals constantly circulate the lubricant—

and (3rd) Self-cleaning, all grit and dirt pass through the spiral slots into the center of the roller, hence do not grind the bearing surface. These and other advantages graphically shown by the diagram below explain why more Hyatt Quiet Bearings are used in automobiles today than any other bearings.

A Cross Section View  
of a Hyatt Roller Bearing

Rollers cannot crush or roll out. Heat treated, chrome nickel steel makes this absolutely impossible.

No adjustment of any kind possible or necessary. Absolutely "fool proof."

Radial loads only, resulting in simplicity of design.

A self-cleaning bearing. Grit from gears, sand and dirt tend to pass through these slots into the center of the roller, hence do not grind away the bearing surfaces.

The flexible roller cushions the road shocks, reduces noise, adjusts irregularities in alignment, and insures full line contact for the load.

Hollow rollers mean large oil capacity and the constant carrying of oil from bottom to top of the bearing.

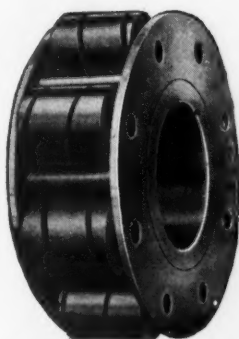
The cage keeps the rollers parallel and is convenient in assembly.

Right and left spirals insure a constant circulation of oil back and forth. Parts of the bearing cannot possibly become dry.

Solid steel inner race. Material of special analysis. Heat treated and accurately ground. This fits over the shaft and under certain conditions may be omitted.

Solid steel outer race. Made of same material as inner race. This is held in the housing.

## Hyatt Quiet Roller Bearings



Complete Hyatt Roller Bearing  
with Outer Race Removed

Two books, one about motor car bearings in general for prospective purchasers, the other for automobile owners, will be sent on request.

**DESIGN AND CONSTRUCTION**—The Hyatt Roller Bearing consists of a number of heat treated flexible spiral rollers, assembled in a strongly constructed cage. This cage is mounted between hardened and ground inner and outer races or casings. This simple and effective construction with the high standard of accuracy in manufacture, has proven remarkably successful in automobile service.

**LINE CONTACT**—Hyatt Roller Bearings afford a full line contact. Ball Bearings only give a single point contact and solid rollers only a series of points. Heavy loads or dead shocks are distributed along this full line contact instead of being concentrated on one or more points.

**MATERIALS**—Only the finest alloy steels,

carefully tested—physically and chemically—and given a uniform and scientific system of heat treatment in the Hyatt Laboratories, are used in the manufacture of these bearings.

**FLEXIBILITY**—These spiral rollers cushion the road shock, and give under strain just enough to relieve the gears and shafts of excessive duty and are yet rigid enough to carry the load. They cannot possibly crush nor roll out, due to the use of heat treated alloy steel.

**QUIETNESS**—The hollow flexible rollers absorb vibrations instead of transmitting them as in the case of a solid roller or ball bearing. This feature materially reduces the noise.

**RELIEVE STRAINS**—Hyatt Roller Bear-

ings by cushioning the "dead shock" and absorbing vibration—relieve the surrounding mechanisms of undue strain.

**LUBRICATION**—The hollow roller retains a large quantity of the lubricant in its center and the spirals alternating left and right constantly distribute the lubricant over the entire bearing surface.

**SELF CLEANING**—Grit and dirt that ordinarily would grind between the bearing surfaces is forced into the hollow center of the rollers through the spiral slots keeping the bearing exceptionally free from foreign matter.

**NON ADJUSTABLE**—These bearings require no delicate adjustments. Given a little lubrication they will give a care free service that is unequalled.

## HYATT ROLLER BEARING CO.

DETROIT, CHICAGO  
NEWARK, N.J.

When Writing to Advertisers, Please Mention Motor Age.



# A Safety Valve is just as necessary on a Tire Pump as it is on a steam engine

## MANZEL

ENGINE DRIVEN TIRE PUMP

Without a Safety Valve on your Tire Pump you are constantly in danger not only of blowing up your tire, but of bodily injury.

If a Tire Pump has capacity enough to give rapid service in its pumping, it has ample capacity to blow every tire to smithereens unless a safety outlet is provided for the excess pressure.

We know of a great number of cases where failure to have a Safety Valve has resulted in serious damage.

Every MANZEL Pump is equipped with a Safety Valve. This also makes it easy to secure the desired pressure in your tire without paying any attention to the power gauge.

Simply set the Safety Valve and start your Pump. When the tire is inflated to the proper pressure the Safety Valve will warn you.

This is just one of the many features of MANZEL construction that place the MANZEL 2-CYLINDER ENGINE DRIVEN TIRE PUMP on a plane of superiority by itself. It is the one quality Pump on the market and yet the retail price is little more than that asked for makeshifts and Pumps made to sell at a price.

*We carry in stock Fittings for the following cars:*

Abbott-Detroit, Buick, Cadillac, Cartercar, Case, Chandler Six, Chalmers, Cole, E.M.F., Franklin, Hudson, Imperial Six, Kissel Kar, Maxwell, Michigan, Mitchell, Oakland, Oldsmobile, Overland, Packard, Paige-Detroit, Rambler Cross Country, Reo, Simplex, Speedwell, Studebaker, Stutz, Velie, and others.

Half  
Actual  
Size

Weight, 7 Pounds

Retail Price

**\$20**

*Complete with all fittings, including 15 feet of air hose, pressure gauge, etc.*



### Manzel Brothers Company

*Leaders, for 16 years, in the manufacture of quality oil pumps for heavy duty steam and gas engines.*

Factory and General Sales Offices

**306 Babcock Street, Buffalo, N. Y.**

#### DISTRIBUTING CENTERS:

Albany, Albuquerque, Atlanta, Baltimore, Billings, Birmingham, Chicago, Cincinnati, Cleveland, Denver, Dallas, Detroit, Des Moines, Ft. Worth, Houston, Indianapolis, Kansas City, Louisville, Milwaukee, Minneapolis, Memphis, New Orleans, New York, Omaha, Portland, Me., Providence, Portland, Ore., Philadelphia, Pittsburgh, Richmond, St. Paul, St. Louis, Salt Lake City, San Francisco, Toledo, Washington, D. C., Wichita.

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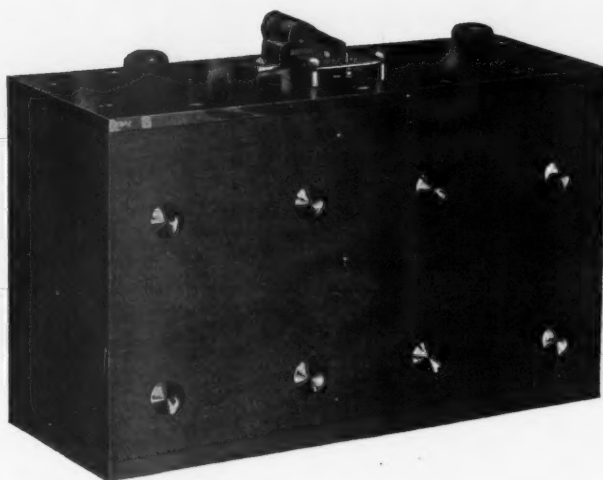
# ANNOUNCEMENT

## KINGSTON

### Single Vibrator Coil for Ford 1914-15 Cars

Only One  
Vibrator  
Adjustment

A Perfect,  
Even Spark  
at Every  
Plug



Why Use  
Four  
Vibrators  
When One  
Will Work  
Far Better?

IT fits in the metal coil box used on 1914 and 1915 Ford cars. Just take out the four vibrating units, slip in the KINGSTON SINGLE VIBRATOR COIL and notice the difference.

It will solve all Ford ignition troubles. The spiral spring on the vibrator will not allow the contact points to stick.

Thirty days' free trial. Write for particulars.

**AGENTS**—There will be a large demand for this coil. Write for our proposition by return mail.

## Kokomo Electric Company, Kokomo, Ind.

*Space C59  
New York Show*

New York Branch  
1733 Broadway

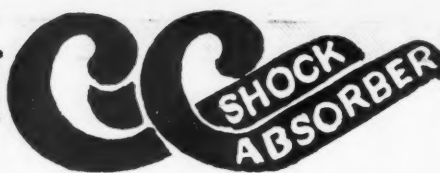
Los Angeles Branch  
334 W. Pico St.

Detroit Branch  
650 Woodward Ave.

*Space 64  
Chicago Show*

Chicago Branch  
1430 Michigan Ave.

*Largest Manufacturers of Spark Coils in the World*



## "The New C-C for Any Car"

regardless of the kind you own, offers you through its use a degree of comfort and economy hitherto possible only by an investment of at least five times the price of the C-C.

The new universal C-C is the masterpiece of shock absorption construction. It is our supreme effort after 40 years of manufacturing experience and we are proud to put the Cox trade mark (the guarantee of absolute satisfaction) upon it.

The new C-C is a sturdy, husky shock absorber designed to take care of the jolts and jars suffered by the heaviest of cars. We would not hesitate to recommend it for use on a limousine weighing two and a half tons, so certain are we that it will stand up to its work, even in that event.

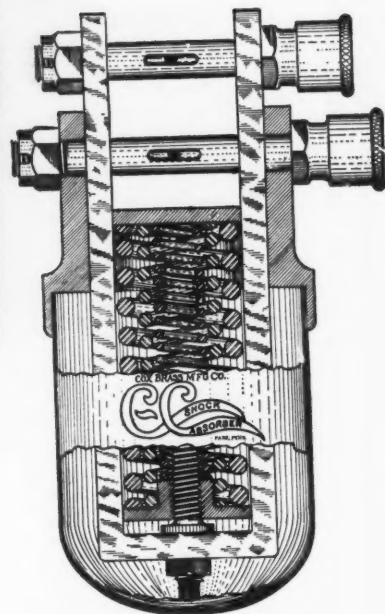
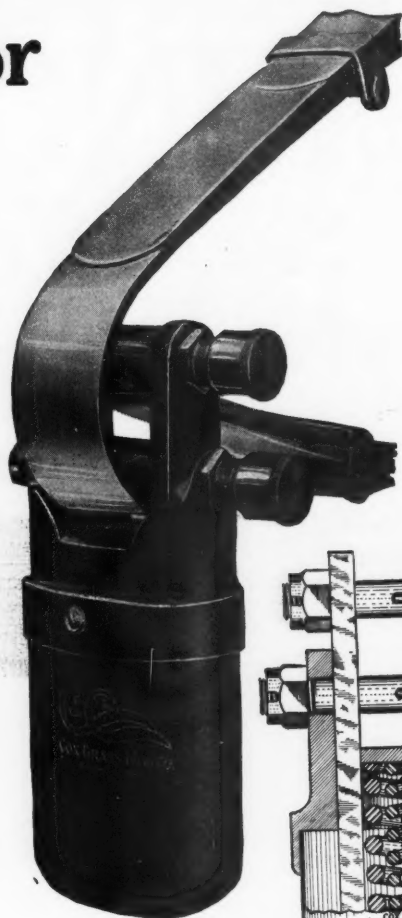
Note the triple spring construction as shown in the line cut herewith. That's only one of the many reasons for the superiority of the C-C.

No longer need you sacrifice your car and your comfort for the new C-C at \$10.00 will serve you and your car satisfactorily as long as your car will last.

Go to your dealer today and have him attach a set of C-C's and you'll swear you have a new car.

DEALERS: Think what the Cox line means to you, the C-C for the Ford for \$8.00 and the C-C for any car for \$10.00. No longer is it necessary for you to carry in stock a dozen different sizes of shock absorbers to meet the varying calls from the different type car owners. The new C-C with an occasional spring change (that you can make yourself) will fit 95 per cent. of the cars on the road today.

Write us today for our dealers' terms. They're mighty attractive.



$\frac{1}{3}$  Actual Size

**easily  
applicable  
to any car**

**Cox Brass Mfg. Co.**

Albany, New York

BRANCHES:

1777 Broadway  
New York City

2637 Michigan Ave.  
Chicago, Ill.

**10<sup>00</sup>**  
**per set  
complete**



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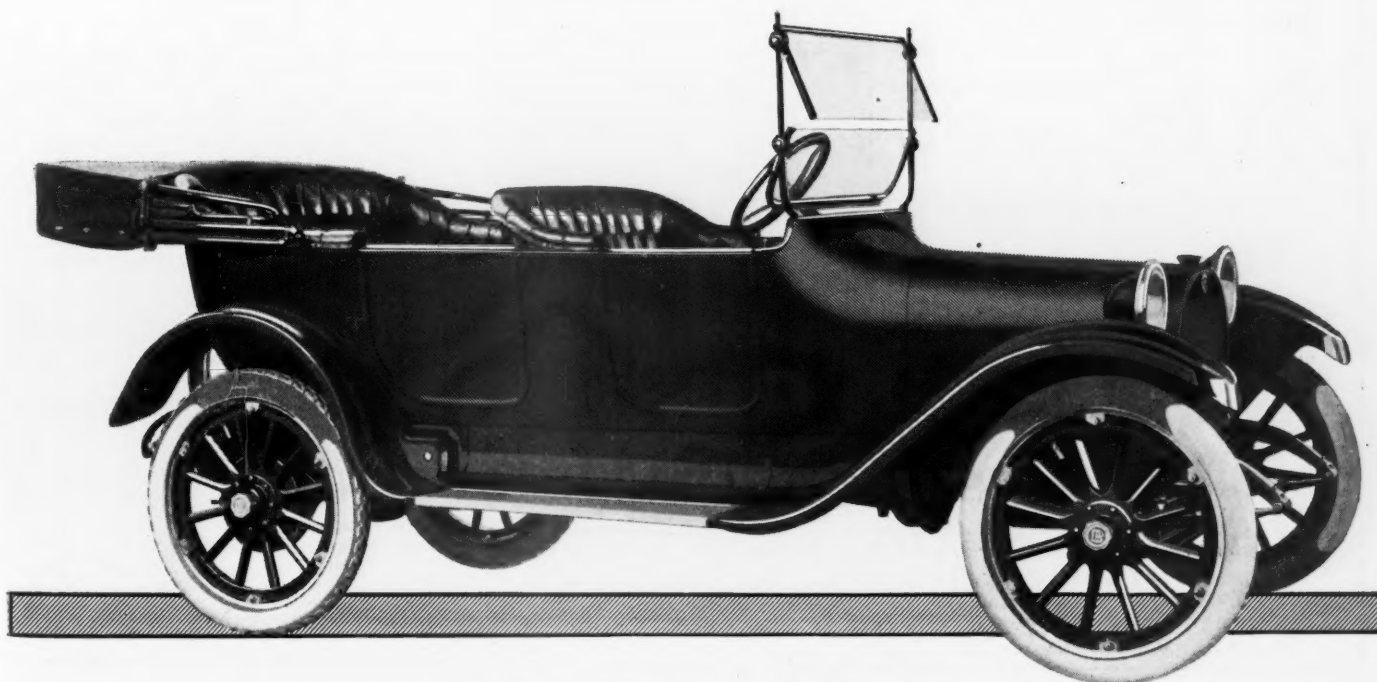
# DODGE BROTHERS MOTOR CAR

Not a detail in the car was determined simply by precedent or custom—the one thought was to see how much Dodge Brothers could give

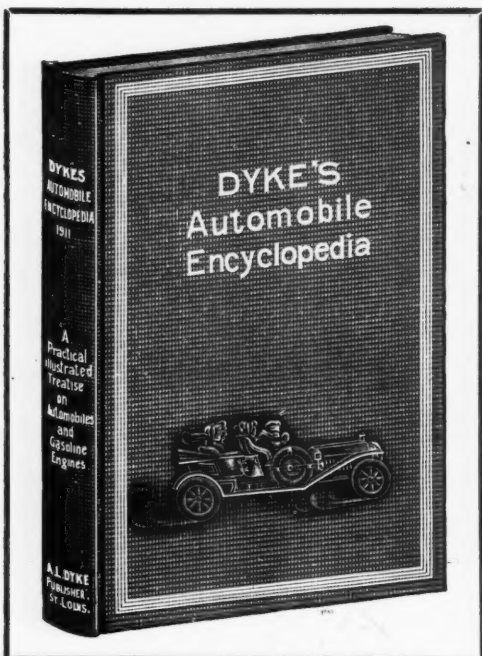
The transmission gears might have been made of some lesser steel—but they were made, instead, of costly Chrome Vanadium heat-treated.

The wheelbase is 110 inches  
The price of the car complete is \$785  
f. o. b. Detroit

**DODGE BROTHERS, DETROIT**



*When Writing to Advertisers, Please Mention Motor Age.*



**Price Three Dollars** postage prepaid

Address Book Department  
**CLASS JOURNAL COMPANY**  
 910 So. Michigan Avenue, CHICAGO, ILL.  
 (12)

## Dyke's Automobile Encyclopedia

is a simple, practical book written by A. L. Dyke, publisher of the first practical treatise on automobiles in America. This revised and enlarged Edition is especially prepared for those who want to learn the principle and construction of all parts

of all cars, thereby enabling one to make repairs and adjustments in an intelligent manner.

This book explains the principle and construction of different ignition, carburetion, cooling and lubricating systems, together with the different types of engines and their valve systems; how to set valves, time the ignition, etc.

**THE DIGEST OF TROUBLES** is very complete—by turning to the index the CAUSE and REMEDY of the trouble is given.

**THE ADJUSTMENT AND REPAIR SUBJECT** is probably the most interesting. The subject of repairing begins with cleaning a car; cleaning carbon, chemically and mechanically; grinding valves; testing compression; taking up lost motion in valve stems and plungers; setting valves and timing the ignition; how to set all leading magnetos; scraping bearings; how to test for knocks and how to locate them; meshing the timing gears; fitting piston rings; carburetor repairs and adjustments; rewiring a car; ignition troubles and remedies; timer troubles and remedies; cooling troubles; how to clean and repair radiators; how to take up wear in differential; how to adjust the steering device; how to treat the clutch; lining up wheels, etc.

**OTHER SUBJECTS**—such as Building a Garage for Home or Business; Equipment of a Shop; Tires; Tire Repairs; Vulcanizing; Lighting a Car; Self-Starters; the Assembly of a Car; Transmission; Axles; Brakes; Differentials; Laws; Insurance; Metric Measurements Connected with English Measurements; Care of a Car.

**ANOTHER FEATURE OF THE BOOK** is the building-up process of a car, from the axles to the body; each part is added by means of progressive charts: First the springs are mounted on the axles, then the frame, then the power plant is mounted on the frame and each and every part is added until the car is completed. In this manner the reader learns the relation of one part to the other. The engine and transmission are assembled in the same manner.

**THIS BOOK IS DIFFERENT.** The matter is arranged in the form of instructions, of which there are 40. The type is clear. There are over 1000 illustrations, in the form of large, clear charts, of which there are 239. The reading matter is so clearly worded, a ten-year-old boy can understand.

**1914 EDITION NOW READY**, with 36 pages, 107 illustrations and 118 questions on the principle, construction and care of Electric Starting, Generating and Lighting Systems.

## “Exactly What You Wanted To Know, Told So You Can Understand It”

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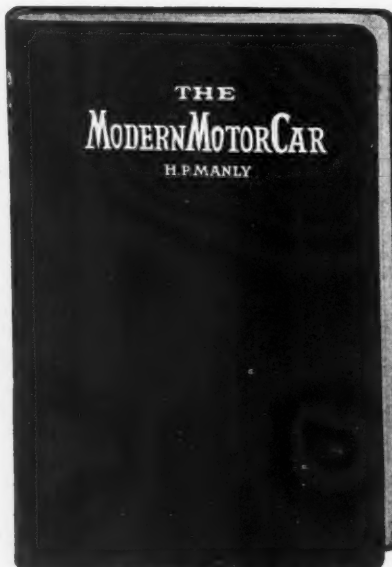
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**PARTS OF THE CAR**—Their Construction, Use, Care and Repair. Contains simple rules for performing every mechanical operation the car can ever need. Not only covers the newest developments, such as eight cylinder engines, vacuum fuel feed, etc., but contemplated improvements from the makers of cars and parts.

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## The real Facts about tires by Old Man Mileage

"Years and years ago when pneumatics were in their infancy, I told manufacturers, dealers and car owners—that without **QUALITY**, good mileage is impossible."

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Old Man Mileage says: "The original effective non-skid tire, The **REPUBLIC STAGGARD TREAD**, is the best **QUALITY** tire I know of. It has a carcass that possesses wonderful responsiveness and stands more punishment than any other. It has a patented tread, imitated by many, equaled by none. It's the tire for real service."



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Also made in a few special sizes.



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—when you enter it from a warm parlor, office, store or theatre? Does it offer you and your family, and your friends, the comfort of a warm room, or the chilly probability of any of a number of ills, provoked by sitting in a cold, drafty car?

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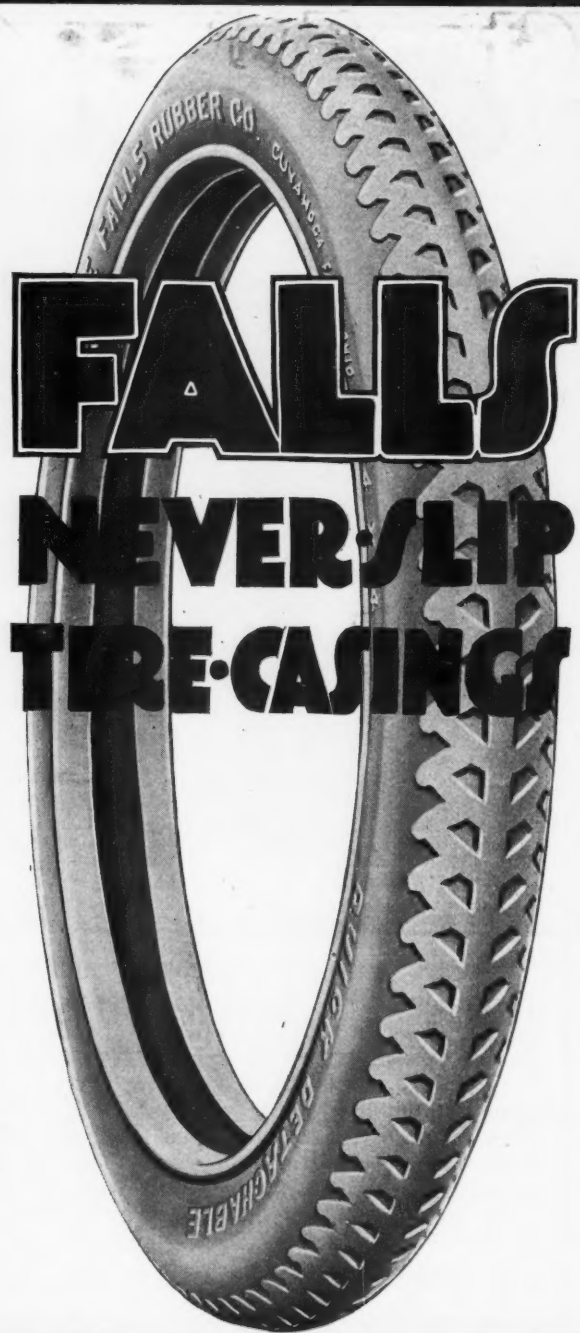
The BAILEY AUTO HEATER is made in several models, and is adapted to all makes of cars, open or enclosed. Installed in half an hour. Is absolutely odorless and noiseless. In ordering state outside measurement of exhaust pipe, and make and model of car.

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They "Stand the Run."  
Protect your pocket-book,  
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demanding "FALLS"  
next time.

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These little open cuts leave the fabric exposed. *Blow-outs* result, and expensive repairs.

Vulcanize these small holes. Seal them up with a Shaler Vulcanizer. Triple your mileage and save half your repair bills.

## SHALER Vulcanizer

A Shaler Vulcanizer will repair any puncture, cut, hole, or tear in casing or tube perfectly and permanently. Has automatic heat control. No danger of undercuring or overcuring.

The Shaler Vulcanizer is the successful result of years of work to make perfect repairs on pneumatic tires by vulcanization.

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We are the world's largest makers of vulcanizers and make the only complete line.

We make Shaler Vulcanizers in every type—Electric, Steam, Gasoline and Alcohol. Shaler Vul-Kit (Gasoline) at \$3.50. Shaler Tube-Kit, \$2.00. Model D (operates from Electric Light Socket) \$12.50. Model

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Complete Garage  
Outfit (Electric  
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\$60.00.

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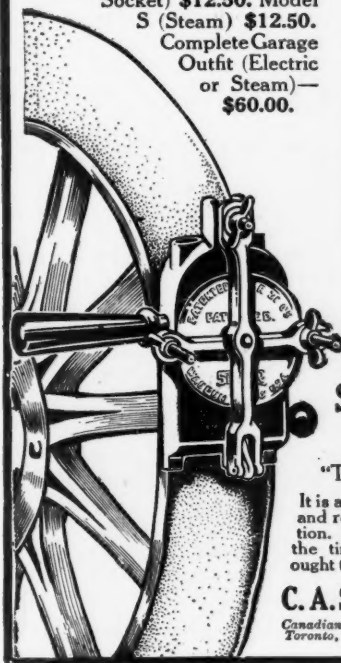
Can be carried in the tool box for emergency repairs. Does away with patches and cement. Absolutely safe. Burns gasoline or alcohol—an exclusive Shaler feature. No watching, no regulating; simply fill the cut with new rubber, clamp on the vulcanizer—fill and light the generator. Can't overcure or undercure. Handle always cool. Anyone can use it. Complete, \$3.50.

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It is a guide and text book on the care and repair of tires. Tells the proper inflation. It describes fully how to protect the tires. It explains everything you ought to know about tires.

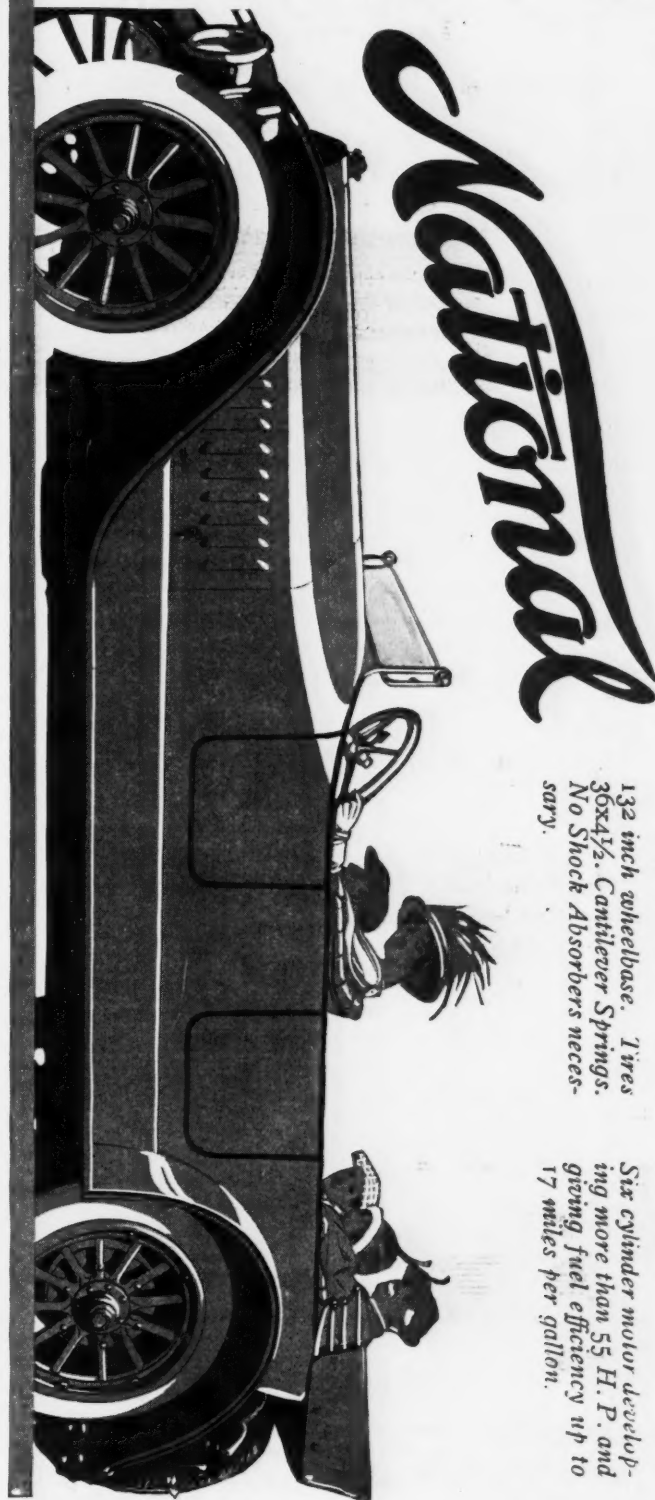
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National Sixes develop any part of 65 H. P. at a fuel efficiency up to 17 miles per gallon.

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INDIANAPOLIS, INDIANA



132 inch wheelbase. Tires 36x4 1/2. Cantilever Springs. No Shock Absorbers necessary.

Six cylinder motor developing more than 55 H. P. and giving fuel efficiency up to 17 miles per gallon.

**Right in Your Neighborhood—you will find a Ford car equipped with**



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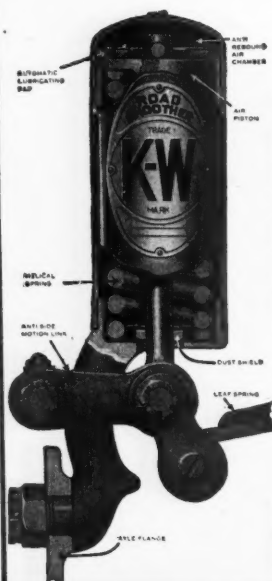
**Quickly Applied to Your Ford Car**

**Ask the owner what they are doing for him every day.**

He can tell you better than we how they smooth out the roughest roads, save the parts of your car—and about their reliability.

What you demand first is comfort. The reasons you get it are—the helical spring that takes up shock; the air chamber that checks rebound, and the anti-side-motion links that prevent side rocking and the chassis from getting out of alignment.

Next, you demand that this comfort be reliable and lasting. The reasons it is permanent are also K-W reasons—high grade heat-treated drop forgings; electric smelted chrome vanadium steel springs (not ordinary spring steel); extra heavy phosphor bronze bushings, and all thoroughly tested and perfectly built.



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The K-W is the only Road Smoother. K-W Road Smoothers are sold by dealers who know the difference, everywhere, at one price.

# \$15

**Set of Four  
One for Each Wheel**

If your dealer cannot supply you sent direct on receipt of price. Write for booklet, "Taking Out the Bumps."

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SPARK PLUGS**



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—you are going to get a power pump. Why put it off?

Get a MAYO now and enjoy the use of it right along—for the life of your car. Discard your back-breaking hand pump. Next time you pump a tire take it easy on the running-board with a—

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The MAYO is the lowest-priced quality power pump on the market. Why pay more than \$10 when the MAYO will do anything any pump will do, regardless of price?

Pumps pure, fresh air only. Adapted to any car. Instantly substituted for any spark plug. Built with metal rings like your motor and will last as long. Complete, with 12 ft. hose, gauge, all connections—

# \$10

MAYO Quick Detachable Spark Plug, \$1.50 extra, may be used if desired. Investigate the two latest additions to our line—the MAYO Ford Pump complete with gauge, 12 ft. hose, all connections, \$8.00, and the MAYO Valve Cap Pump for permanent attachment to the motor, complete at \$15.00.

**Try One Free on Your Car for 30 Days**

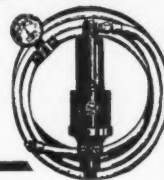
**Dealers**—The MAYO Pumps are all easy sellers, especially on our 30-day free trial plan. Write for dealers' discounts.

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## An Electric Car That Climbs Mountains!

## Gould Battery Used For Driving

A BEARDSLEY Electric Car, driven by Gould Battery, recently carried its owner and 650 pounds of passenger load up Lookout Mountain, near Los Angeles, Cal.

The route included sharp turns and steep grades which would have made trouble for many gas cars, yet power from the Gould Battery never wavered. The car ran smoothly and evenly as over the level boulevard.

The Gould Battery in the roadster type of Beardsley cars has shown itself capable of a speed of 30 miles an hour and a distance of 100 car miles on each charge.

Do you wonder then that the Beardsley Electric Co. has adopted the Gould Battery as the standard for all its cars?

Tell us the name and model of your car if you want to know what improvement would be made by putting in Gould renewals (which fit jars of any make).

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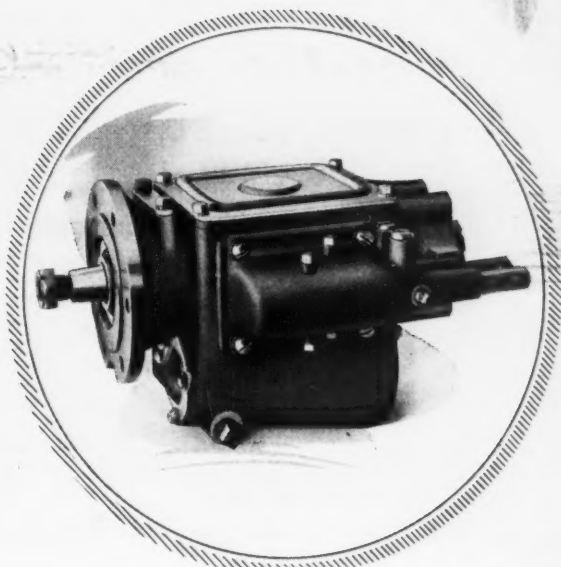
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Full stock of parts, plates and repairs carried by all  
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Warner Model T43 Transmission

The superiority of Warner Gear Company products over all others is undeniably proclaimed by their reputation.

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DIFFERENTIALS  
CLUTCHES

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FORD BUILDING

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Sounds like a lot of money—IT IS—A WHOLE LOT of MONEY to be earning CLEAR every month—yet it's what hundreds of men we have established in the Automobile Tire Repair Business are making. You let down the DRAW BRIDGE for SUCCESS to enter into your career by getting into business for yourself. The business for you is the one where investment is small—the returns quick and for cash—where the margin of profit is large—the demand for your PRODUCT or SERVICE constant and ever on the increase.

## A Haywood Tire Repair Equipment

answers to all of these requirements of Old Dame Fortune—the certainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

### Here Is Your Opportunity!

Be first to enter this new, big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnston, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as a side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

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Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend college or to start a garage and repair business. Auto owners—repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow, investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.

This Man is Making Money

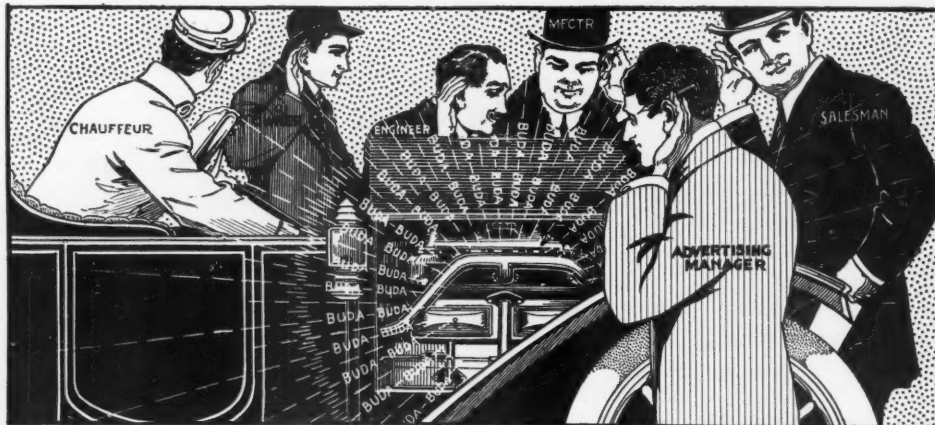


**HAYWOOD TIRE & EQUIPMENT COMPANY**

720 N. Capitol Avenue The New Money-Making  
INDIANAPOLIS, INDIANA Business—Start Now

## LISTEN! HERE IS AN IMPORTANT MESSAGE:

The Part that Sells the Car—that Sells the Car—that Sells the Car—that Sells the Car—



The Part that Sells the Car—that Sells the Car—that Sells the Car—that Sells the Car—

The silent Buda motor does its own talking—and yours.

WISE MANUFACTURERS HAVE BUDA MOTOR FOR THEIR "SILENT SALES MANAGER."

"THE PIONEER IN AMERICA OF THE

ASK US  
Chicago Show  
January 23-30  
Space 34, Gallery  
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# BUDA

## MOTOR

"The Part That Sells the Car"

**BRANDENBURG & COMPANY**

CAST-IN-BLOCK CONSTRUCTION"

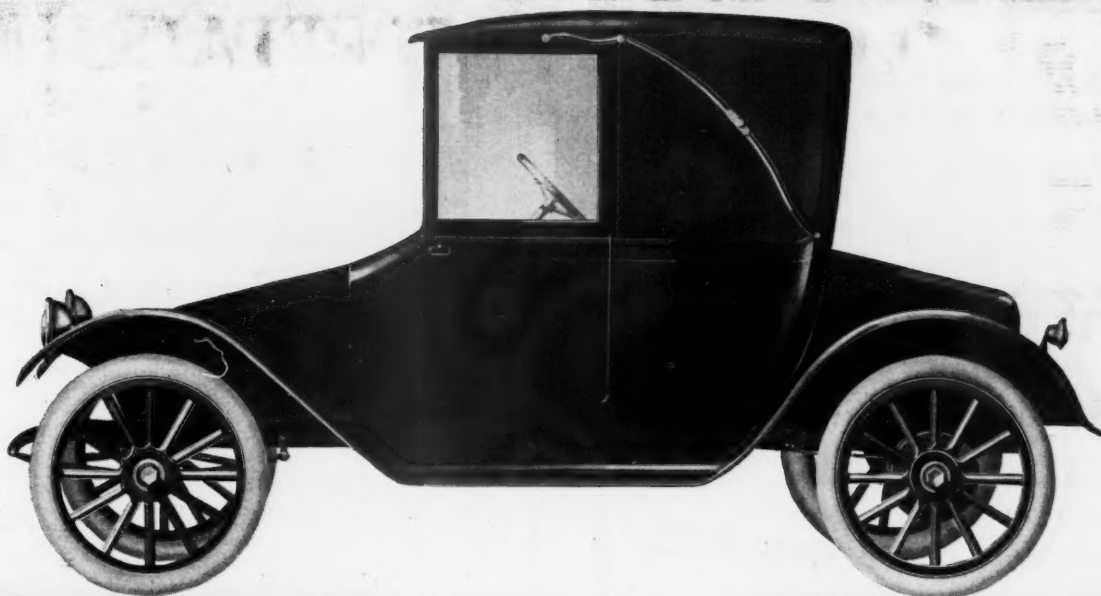
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ANNOUNCES

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A car embodying all the luxurious comforts and conveniences of the high priced electrics. Specifications include three-passenger cabriolet, body elegantly finished, worm gear drive, cantilever rear springs. This car for less than a thousand dollars. We invite correspondence with dealers. February delivery.

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**O**WN your own tire trade. Become the Miller dealer and get into business for yourself—build a permanent, profitable trade that is all yours. The only reason you should sell tires is to make money—why not sell the tire that will make you the most money? The profits from Miller sales are not spread thinly among several dealers in your town.

All the Miller profits are yours because you control the sale of the tire. We don't pit one dealer against another. A car owner can't buy a Miller tire cheaper anywhere else than from you.

Put Yourself On The Map With

# Miller GEARED TO THE ROAD Tires

Twenty-three years of all kinds of rubber experience safeguards our tires and your business. There is only one grade of Miller tires—and that the highest. Join the Miller prosperity procession. People demand genuine quality today—not imaginary merit. Miller tires give the user the greatest service and the dealer the most profit. Don't take this for granted but make us prove it. Your inquiry will receive the personal attention of Miller executives who have the authority to tell you—but write and find out what.

The Miller Rubber Co., Akron, O.





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—if you properly connect the two. You can easily afford to stop your battery expense and inconvenience, and be comfortable, knowing that your—

## Teco Storage Battery Charger

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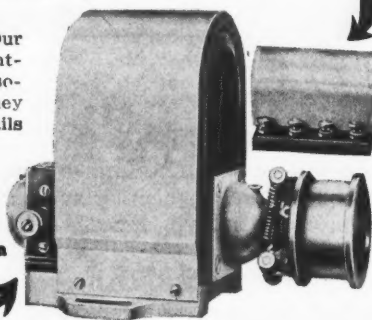
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Economize on your complete electric lighting system and accessories. Write for our catalog today.

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Chains—Keys—Hand Milling Machine

## For An Easy Start With a Cold Motor

PRICE  
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Eliminate your starting troubles NOW. Equip your car with an

## Jeco MANIFOLD PLUG

This inexpensive little device will enable you to start your motor on the coldest day as easily as on a warm summer day. We say it will. Your money back if it don't.

The principle is simple. A few drops of gasoline into the priming cup on the dash. No lifting the hood, mind you. Then turn the motor over and bang! away she goes.

The priming charge has passed through the manifold plug which contains an electrically heated coil and has entered the cylinders perfectly vaporized, ready to explode at the first spark.

Another thing: it admits auxiliary air to the manifold at higher speeds resulting in 20% to 30% increased mileage per gallon of gasoline.

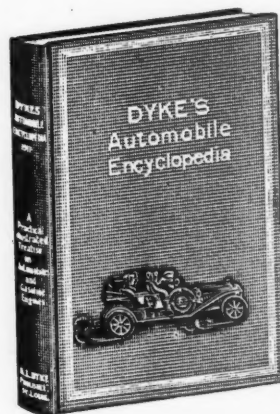
Can also be used to introduce kerosene into the cylinders in order to clear them of carbon.

Easy to attach if you follow our simple instructions. Dealers wanted everywhere.

Interstate Electric Company  
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New Orleans, La.

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by A. L. Dyke, E.E.



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¶ Teaches you to overhaul a car from the ground up.

NOTE—The new 1914 Book contains a new supplement on the principle, construction, operation and care of leading ELECTRIC STARTING, GENERATING AND LIGHTING SYSTEMS. Deice and other systems are simplified so a child can understand. Cadillac magnetic latch, two speed rear axle, etc., explained. PRICE, \$8.00, postage prepaid.

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Can be heard a block or a mile. It pleases the ear whether blown low or loud. Just the horn you want. Here are the reasons:

**Musical Sound**—Built on the principle of a pipe organ. Four notes, blown at once, produce perfect harmony.

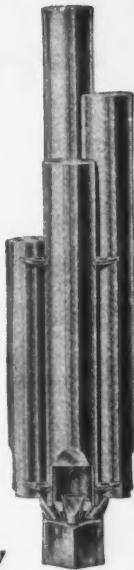
**No Upkeep**—First cost is only cost. Made of brass tubes, nickel-plated. Nothing to wear out.

**Reliable**—Cannot clog. Cannot be tampered with when car is standing.

**Clears the Way**—Amplly warns but does not frighten.

**Easy to Put On**—Nothing shows but the foot pedal.

Get it from almost any dealer. Price \$5.50 to \$7.50 complete. Every horn guaranteed. Sold direct where local dealer does not carry it. Descriptive folder sent on request.



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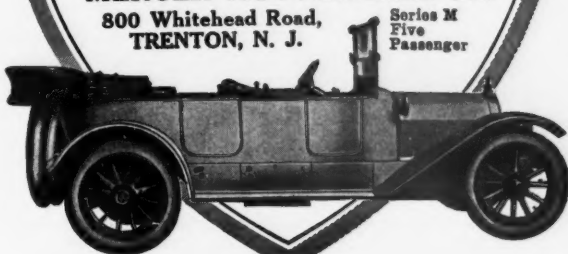
**22-70 Runabout**

The Real Surprise of the Year

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Series M  
Five  
Passenger



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**20-lb. Cans - 3.00**

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IMPROVED MANUFACTURING PROCESSES plus greater output equal lower production costs. The saving is our New Year's gift to motorists.

You who are using NON-FLUID OIL can do so with greater economy from now on.

You who are not using NON-FLUID OIL, listen—

Friction is slowly eating away the bearings and wearing down the gears of your car. It's but sound business to check this deterioration by using the highest grade and most efficient lubricant procurable.

NON-FLUID OIL has been recommended as such by the leading car builders since the first days of motoring.

K No. 000 Grade is for bearings; K No. 00 SPECIAL for gears. Get a can of each from your dealer today, or mail coupon for free samples.

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1430 Michigan Ave., Chicago

N. Y. & N. J. Lubricant Co., 165 Broadway, N. Y.

Send sample cans "K No. 00 SPECIAL" and "K No. 000" grades NON-FLUID OIL.

Name .....

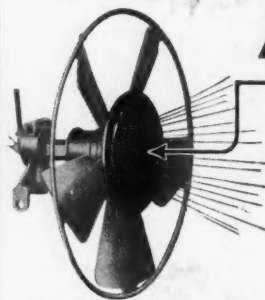
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## Prime Your Engine with Prest-O-Lite to start easily

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Acetylene priming is indispensable with any method of starting, ensuring quick and easy starts in any weather. Saves the mechanism—saves your arm. The Prest-O-Primer is easily and quickly attached to any car. Write for details.

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America's best fan with  
horn as integral part

## Beartone

HORN AND FAN

Write for complete information about this new motor car horn, built by America's greatest manufacturers of fans. Something new and better. No gears, motor, batteries or wires to give trouble; gives warning signal by merely pushing button; gives any tone from polite whisper to loud, far-reaching noise; increases fan efficiency; never fails; long life; is easily interchangeable with fan on any car, in minute's time; requires no lubrication other than fan requires; a motor car horn is for safety—then get the SAFEST, most reliable and efficient horn—the Beartone. Write

**THE OAKES CO.,**



Indianapolis, Ind., U. S. A.



### IT'S GETTING COLD

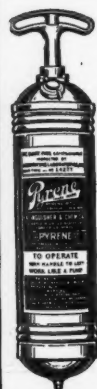
but your engine will start as quickly as in Summer and the cylinders will fire as regularly if equipped with

**Red Head**  
REG. U. S. PAT. OFF.

1915 PRIMING PLUGS  
Masters the motor at any temperature  
All Sizes \$1.25 Porcelain or Mica

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A scientific agent which extinguishes every kind of incipient fire—gasoline, and electric, as well as the ordinary kind.

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"A Quality Car at a Quantity Price"

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| TOURING CARS | PRICES       | ROADSTERS   |
| 5 PASSENGER  | <b>\$975</b> | 2 PASSENGER |

Completely and fully equipped, with Westinghouse Starting, Lighting and Ignition System

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Manufactured by **VULCAN CAR CO.,** Painesville, O.

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**THE PRODUCT OF BRAKE SPECIALISTS**  
USED FOR  
BRAKE LINING - CLUTCH FACING  
Manufactured by  
**THE ROYAL EQUIPMENT COMPANY**  
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We now sell Bricton Pneumatic Tires on a specific guarantee of 10,000 miles service. Bricton Pneumatic Tires are Puncture-proof, Blowout-proof, Skid-proof, Rut-proof, Rim cut-proof, Oil-proof and Gasoline-proof. A tire with wonderful resiliency and easy riding qualities.

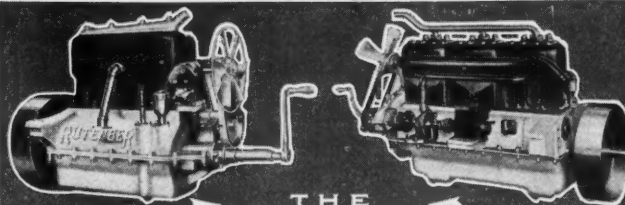
**FREE TRIAL OFFER**—To remove any possible doubt concerning the merits of Bricton Tires and to back up our statements fully, we have a FREE TRIAL offer at our own risk. The only tire made that offers a FREE TRIAL—you can't go wrong. You risk nothing. We take all the risk. Be sure and ask for our FREE TRIAL plan when you write for particulars. Have Your present Tires Rebuilt the **BRICTON WAY**—

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Mile  
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Guarantee  
with every  
Bricton  
Tire assures  
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Economy  
you have  
never  
known  
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possesses the virtue of economy in first cost and in subsequent up-keep, revealing the merit of sterling quality in every detail of construction and renders as consistent and efficient service as motors costing twice as much to buy and maintain.

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The New Stromberg Carburetors make records for Economy, Power, Acceleration and Smoothness of Running.

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Send us make and model of your car and we'll tell you which new model Stromberg is best adapted for it.

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Keep your expenses where they are, but double your deliveries by hitching a Troy Trailer to your motor truck. That divides your costs and multiplies your capacity. Stop carrying and start hauling. Capitalize the draw-bar pull of your truck. Make one truck do the work of two. Every truck can pull more than it can carry if it has the right type of Trailer. Troy Trailers are proved by performance. Write for new book 4-MA.

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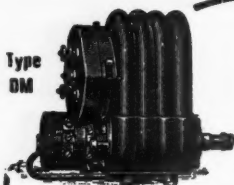


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WINNER OF THE  
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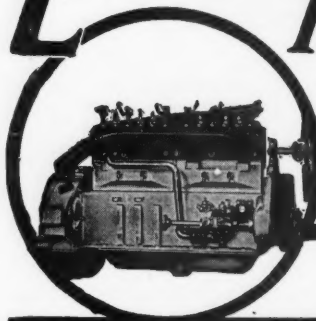
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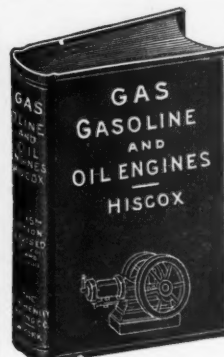
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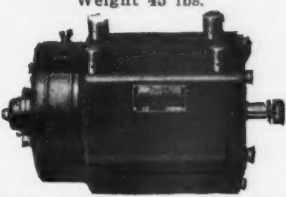
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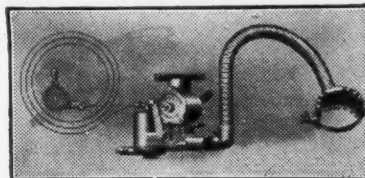
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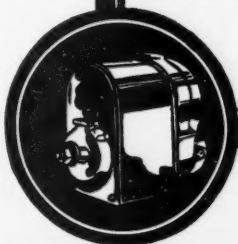
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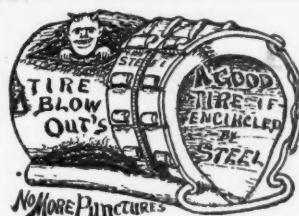
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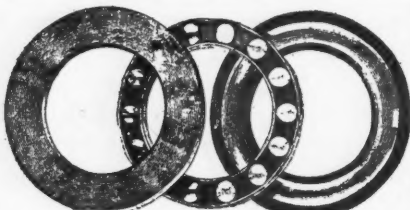
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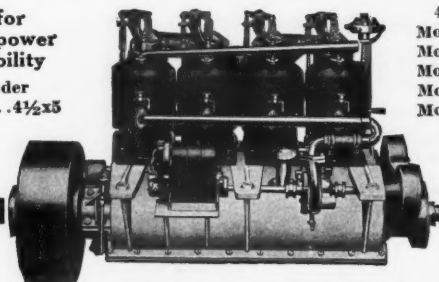
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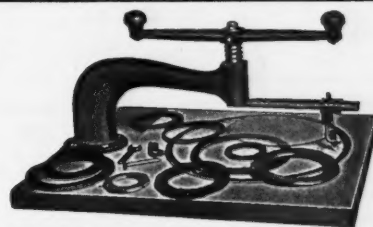
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FRICITION REDUCING MOTOR OIL

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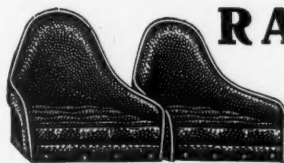
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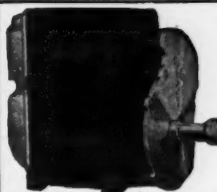
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Selling out at one-half price the entire stock of the Service Storage Battery Co., 6-60 to 6-150 lighting, igniting and starting batteries.  
**SIMPLEX BATTERY CO.**  
120 E. 33rd Blvd. Chicago, Ill.

**AAA SPEEDOMETERS AAA**  
Send for special price list of Speedometer Parts.  
**GENERAL SPEEDOMETER REPAIR CO.,**  
53 W. 63rd St., New York City



# The Clearing House—continued.

## AGENTS AND DEALERS

We announce a reduction of from \$20.00 to \$14.00 on our Spare Demountable Wheels for the Ford. We have some good territory left. Why not handle an original line? Carry extra wheel with tire on ready and interchangeable with any of present wheels. Can install outfit at home, then change wheels in less than two minutes. Write for catalogue. Legitimate dealers, get our agency for Spare Wheels, Spring Radius Rods, Fan Belts, Radiators, Cradles, etc. "ANGIER'S," Dept. B, Streator, Ill., U. S. A.

## A Happy New Year To All

### WHO BUY THESE AND OTHER BARGAINS

|  |           |
|--|-----------|
| 6 cyl. Maxwell motor with carburetor             | \$175.00  |
| 6 cyl. American, 4 1/2 x 6" motor                | 275.00    |
| 4 cyl. Herschell Spillman motor                  | 200.00    |
| Used Michigan 4 1/2 x 5 1/2                      | 115.00    |
| 4" or 4 1/2" American piston finished, each      | 1.50      |
| American Scout crank shafts                      | 20.00     |
| Brown & Lipe differentials, less gear            | 10.00     |
| New Warner differentials, less gear              | 9.00      |
| F. A. L. 52 tooth ring gears, hardened           | 3.00      |
| Fenders, enameled, 8" and 9" wide, set 4         | 8.00      |
| Standard shaft drive axles, hubs and drums       | 30.00     |
| New Logan chain drive axles, less hubs           | 15.00     |
| One-half ton chain drive jackshaft with sprocket | 15.00     |
| Solid axle, 1 1/2 x 2", with hubs and caps       | 18.00     |
| 48 tooth sprockets, brake drums and bands        | 16.00     |
| 34x3 1/2, 36x3 1/2 wheels, Q. D. rims, set       | 8.00      |
| 34x4 demountable wheels with rims                | 20.00     |
| 34x4 Goodyear Q. D. rims, each                   | 2.00      |
| Pressed steel frames, all sizes                  | \$3.00 up |
| Ward Leonard generator (used)                    | 15.00     |
| New shopworn Rayfield 1" and 1 1/4" carburetors  | 11.00     |
| Ford radiators, V-shape, brass                   | 23.00     |
| Model 10 Buick radiator                          | 24.50     |
| Zig Zag windshield, 38x25 1/2                    | 7.50      |
| Henderson one piece nickel shield, 41x20"        | 9.00      |

Thousand Bargains. Send for List.

Dept. O

## AUTO PARTS COMPANY

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## ALL PARTS IN STOCK AT DISCOUNT

Atlas, Bergdoll, Chalmers, Ewing, Alco, Packard, Hudson, Herrshoff, etc. Brown-Lipe Gear Parts, Continental Motor Parts, STA-RITE Rings, \$1.00 each. Regular Piston Rings, 30c each.

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ALL SEASON'S RECORDS MADE WITH Schebler equipment. Why not get a Schebler model R for your car? Our exchange proposition makes it easy.

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Exclusive Sales Representatives for Manufacturers who supplied Motors, Axles, Wheels, Transmissions, Steering Columns, Control Levers, etc., etc., to the

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Write for prices on parts needed in connection with American cars.

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Motor Car Parts and Service

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Send for our monthly bargain list on new and used dynamos, lamps and electric equipment for automobiles and boats.

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We have purchased the jigs, tools, drawings and can supply immediately parts at less than cost to manufacture. Order now—20% off.

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## MICHIGAN, MORA AND DRAGON PARTS IN STOCK

We maintain a complete stock of parts for the above cars.

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Send broken parts—we will duplicate promptly. TIRES, what size—we save you money—try us.

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New and second hand for many makes of cars for sale cheap. Write us when in need of parts.

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Mohair Tops for runabouts, \$20.00; Mohair Tops for touring cars, \$30.00; Racing Seats, per pair, \$18.00. AMERICAN AUTO TOP MFG. CO., 1451 W. Washington Blvd., Chicago, Ill.

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Seat covers and body building, remodeling and trimming. Write for prices.

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New and used factory prices. Give size and state if for ignition or lighting in first letter. Spark plugs 1/2" @ \$2.00 a dozen.

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We guarantee them as

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All sizes and makes in stock ready for immediate delivery—At prices that will interest you.

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CoCoa and Carpet Mats, Hand Made Seat Covers, Auto Tops Built and Repaired.

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Get Our Circular

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Equipped with F. & H. Special Wire Wheel Rims. Adaptable to any car. Complete equipment for Ford cars.

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operates from the dash. Starts car on coldest days. Something new; worth \$5.00. Sent prepaid for only \$1.00. Agents wanted.

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12 styles, all sizes. Agents wanted everywhere.

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Equip your cars with Seat Covers. Our direct to car-owners plan will save you money. Ten thousand satisfied customers last year.

## GLOBE SEAT COVER CO.

Dept. M, RACINE, WIS.

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You can get complete doors and panels from us at a reasonable price.

GET BUSY AND MODERNIZE YOUR CAR. Write for prices. We have all patterns. We also make racing seats, bodies, radiator covers, etc., etc.

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## FOR SALE AT A BARGAIN

New 5x6 four-cylinder, governor-controlled engine, fully equipped, with carburetor, magneto. Will sell for much less than cost. FRED HANSON, 570 Prior Ave., St. Paul, Minn.

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A small number of modern, well designed and constructed six, five and four-passenger touring bodies and comfortable roadsters painted and trimmed. Will change and guarantee to fit your car. Write us.

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Get our proposition on fibre gears for all makes of speedometers. We make anything you want from fibre.

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# The Clearing House—continued.

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Thousands have, and do not know where to get repair parts for them.

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We are the Original Repair Parts Factory. We furnish repair parts for over fifty-three models of cars, such as Warren, Elmore, Marquette, Rainier, Welch-Detroit, Welch-Pontiac, F. A. L., Reliable Dayton, Barnes, DeLuxe, Demot, Michigan, Cutting, Northern, Queen, Wayne, Crow, Anhut, Herreshoff, Henderson, and many others. If you want any part for any auto, write us.

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|                                      |         |
|--------------------------------------|---------|
| Cadillac tops, mohair, complete..... | \$22.00 |
| E. M. F. Roadster.....               | 10.00   |
| E. M. F. Touring Car.....            | 15.00   |
| Chalmers 26.....                     | 22.00   |
| Hupp 20 Roadster, used.....          | 6.00    |
| Maxwell Model 25.....                | 12.00   |
| Buick Model 10 Touring Car.....      | 10.00   |
| Paige Tops.....                      | 12.00   |
| (And many others.)                   |         |

#### REAR AXLES

|   |       |
|---|-------|
| 3/4 Floating Weston-Mott.....                 | 25.00 |
| Full Floating Sheldon Axles.....              | 50.00 |
| Full Floating Lewis and Weston-Mott.....      | 75.00 |
| McCue.....                                    | 50.00 |
| E. M. F. 30 Rear Axles with Transmission..... | 65.00 |
| Front Axles, all styles.....                  | 10.00 |

#### BODIES

|                                       |       |
|---------------------------------------|-------|
| Studebaker Model 35, 7 passenger..... | 60.00 |
| E. M. F. 5 passenger.....             | 55.00 |
| Oakland 5 passenger.....              | 60.00 |
| Abbott 7 passenger.....               | 60.00 |
| Warren Roadster Bodies.....           | 55.00 |
| Michigan 5 passenger in white.....    | 15.00 |

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|  |       |
|--|-------|
| 4 cyl. Splittorf kick switch coils.....                                    | 8.00  |
| 4 cyl. Remy coils Models S-T-RL and RD.....                                | 6.00  |
| 4 cyl. Briggs coils.....   | 6.00  |
| Splittorf Tubular Coils.....   | 6.00  |
| 4 cyl. Remy, Splittorf, Briggs, Heinze, and Pittsfield Magnetos, each..... | 10.00 |
| 4 cyl. EU 4 Elsmann High Tension.....                                      | 25.00 |
| 4 cyl. High Tension Volta Magnetos.....                                    | 15.00 |

#### CARBURETORS

All kinds. Get our prices.

Gas Head Lamps, \$5.00 to \$7.00 pair; Electric Head Lamps, \$6.50 to \$9.00 pair. All other kinds at excursion rates.

Gas Generators, 75c; Model B Presto Tanks, \$10.50; Model E Presto Tanks, \$9.00; Fenders for many cars, \$3.00; Wheels, \$3.00.

Great bargains in windshields, tool boxes, dashes, brake lining, spark plugs, tire pumps, tool kits, \$1.09; reliners, blow-out patches, cements and everything pertaining to your car at a price.

Guaranteed New Tires—Weed Chains. Radiators for all cars at a big saving.

Get our money saving catalog

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ALFRED O. DUNK, President

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## GUARANTEED RADIATORS

Not always necessary to buy new radiators. New cores can be furnished for frozen or damaged radiators. We build the fin and tube type. Guaranteed copper fins and tube.

We also repair and furnish new cores for Maya radiators.

We build new cores for all makes and for all cars. Get our prices. You will save money.

Cores in stock for many standard radiators such as Hupps, Warrens, Herreshoffs, Buicks, E. M. F. 30, Studebaker, Hudson 20, Cadillacs and several others.

We can build and fit a new core in your radiator in two days—if in stock, in one day.

Write for bargain sheet of accessories.

### HURON RADIATOR & LAMP CO.

253-255 Jefferson Ave., Detroit, Mich.

Terms cash with the order.

## GUARANTEED RADIATORS

You need a strong, well built radiator these winter days.

#### HONEYCOMB RADIATORS

|                                   |         |
|-----------------------------------|---------|
| Ford T.....                       | \$25.00 |
| Hupp.....                         | 25.00   |
| Buick 10, 24, 25, 34, 35, 36..... | 27.50   |
| Buick 16, 17, 19, 26, 27, 28..... | 37.50   |
| Buick 21, 38, 39, 43.....         | 37.50   |

#### FIN AND TUBE RADIATORS

|  |         |
|--|---------|
| Ford T.....                            | \$20.00 |
| Buick 10.....                          | 25.00   |
| Buick 24, 25, 34, 35, 36, B24, 25..... | 22.50   |
| Buick 16, 17, 38, 39.....              | 31.00   |
| Buick 19, 27, 28, 43.....              | 28.00   |
| Buick 21.....                          | 30.00   |

Will ship on telegram same day C. O. D.

### Detroit Radiator & Specialty Co.

963 Woodward Ave. Detroit, Mich.

## MAXWELL OWNERS AND REPAIRMEN

Why pay 20% advance for your repair parts for the old models of MAXWELL cars? We can supply 90% of your wants at the old list price. Transmission gears and parts in stock for Cadillac, Case, Croxton, Dorris, Elmore, Moline, Moyer, Oveland, Regal, Selden, Stoddard, Velle and 75 others at cut prices. Why pay more? Send for price list.

### M. P. SUPPLY COMPANY

Atlanta, Georgia

Michigan, F. A. L., Elmore, Deal, Midland, American, Henderson, Repair Parts Furnished. We also build and repair radiators, cylinders, crank shafts, etc.

Department O

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We can ship immediately every part for every Michigan car, no matter what the model. We purchased and are successors to the Michigan Motor Car Co. and have sole access to all patterns and engineering data.

Every part guaranteed to be accurate. Shipment same day order is received.

MICHIGAN MOTOR CAR PARTS CO.  
Successors to Michigan Motor Car Co.  
KALAMAZOO, MICH.

### NEW FORD TOURING CAR TOPS

Complete \$16 for 1918 and 1914. We can furnish tops for any make of car. Write for prices. All kinds of auto parts and accessories.

### NICHOALDS COMPANY

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### Auto Parts and Accessories

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11½-in. Black and Nickel Oil Sidelights.  
9½-in. Black and Nickel Oil Tail Lamps.  
Complete set, 5 lamps for.....\$8.00

Mohair Touring Car Tops, with Collins adjustable side curtains, slip cover and windshield straps, made to fit Model 26 Chalmers cars, complete.....\$25.00

M. & M. Ford Shock Absorbers, ride easier and smoother than any other make, double spring enclosed. Price per set of four.....\$7.50

Weston-Mott Rear Axles.....\$50.00

I-Beam Front Axles.....15.00

Splittorf Magneto, Model D-F

and X, 4 cylinder.....10.00

Simms Magnetos, 4-cyl., high tension, dual, with coil and lock switch.....35.00

### AUTO ENGINES

Owen—4 cyl., 50 H. P.....\$250.00

Howard—6 cyl., 50 H. P.....400.00

Garford—4 cyl., 40 H. P.....95.00

Model, 4 cyl., 25 H. P., with trans. 125.00

American-British, 4 cyl., 22 H. P.

unit with transmission and clutch 135.00

Write for Full Information

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## MORE SPEED FOR THE FORD

Special ratio Differential Gears for the Racy Type Ford.

2½—1 ratio.....\$15.00 Set

3 —1 ratio.....15.00 Set

Absolutely interchangeable with the present gearing

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## NEW 1914 FORD ROADSTER BODIES

Including cushion, top, curtains, slip cover and rear fenders; crated, \$85.00 F. O. B. Detroit. New 1914 Ford Touring Car Bodies, including equipment mentioned above, crated, \$85.00 F. O. B. Detroit.

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## OVERLAND BODIES

Model 79 Overland touring bodies complete with top and wind shield, brand new.

\$150 Each

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# The Clearing House—continued.

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Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

**Arsenal Varnish Company**  
Auto Dept. Rock Island, Ill.

**RADIATOR**—"The conservator"—Protector (pat. pend.). The only scientifically designed radiator protector on the market. Write for literature. Dealers take note. Made for all cars. Ford special, \$1.50.  
**JOHN J. HUDSON** Tarrytown, N. Y.

## PRICE WRECKERS

Our new Price Wrecker (catalogue) just printed quotes Dealers' prices on all accessories, motors, transmissions, tops, bodies, windshields, etc. Sent free on request.

### A FEW OF OUR BARGAINS

New Herschel-Spillman Motors 4 and 6 cylinder, \$275.00; other motors, \$65.00 up. \$300 Fore-door touring bodies now \$85.00. Runabout bodies—1914 Ford new \$35.00; others \$40.00 and \$50.00. Runabout tops \$15.00. Touring \$25.00 (measurement blank sent on request); Racing Seats \$10.00 each. Spicer Universal joints \$4.00 each; mechanical oilers \$4.00 up; windshields \$5.00 up; special nickel 1 piece Rainvision shield \$10.00; Disco self-starter \$5.00; Remy complete dual system magnetos Model R. L. and R. D. \$25.00; others \$5.00 up; Rayfield, Stromberg and Schebler carburetors \$5.00 up; gloves \$1.00 up. Racoon Fur Coats (special bargain) \$18.00, double plush robes \$3.50 each, bulb horns 75c, electric horns complete with wire and button \$1.95, hand horns (mechanical) \$1.50, exhaust horns (all sizes) \$2.50, spark plug pumps \$5.00, double action pumps \$1.75.

### SPARK PLUGS

Special 5 for \$1.00, Mosler 4 for \$1.00, Timesco 3 for \$1.00; Bearings all \$1.00 up to \$5.00.

### SPRING SHOCK ABSORBERS

\$12.50 buys the latest in spring shock absorbers equal to the highest grade on the market selling at \$35.00. Easy to install. On all good cars as regular equipment.

Hartford-Mondex shock absorbers, \$5.00 each; Rims, detachable or demountable, \$2.50 and \$3.00 each; all makes and sizes. Storage batteries, \$6.00; tool boxes, \$1.00 and \$2.00; raincoats, \$1.90; rubber "slip-on" shirts, \$2.50, clocks, \$1.00 up; gas tanks, \$2.50; Prest-O-Lite (genuine) tanks style B, \$12.50 (complete).

### LAMPS

Slide oil \$3.00 pair, side electric \$2.00 pair, tail oil or electric \$1.15, gas headlights, \$5.00 pair (large), electric headlights (large) \$7.00 pair; Gray & Davis large swivel searchlights \$9.00 each.

### RADIATORS

ALL MAKES at less than 1/2 price. Buick "10" \$19.75; Buick 16/17 \$36.00, Hudson "20" \$29.00, Hudson "33" \$29.00 new. Many others. Radiators repaired or traded in.

### FORD

exhaust horns, \$1.65; electric headlights, \$6.00 pair (Gray & Davis). Special Ford Holley carburetor, \$3.50. Set of 4 inclosed spring shock absorbers, \$7.50; master vibrators \$3.25-\$4.50. Automobiles and trucks, new and used. WAR PRICES. Send for special list and say what type you are interested in.

## TIMES SQUARE AUTOMOBILE COMPANY

(Largest Dealers in the World)  
1210 Michigan Avenue Chicago, Ill. 1743 Broadway New York City

## RADIATORS

### WHILE THE STOCK LASTS

| Name.           | Model.   | Price.  |
|-----------------|----------|---------|
| Brush           | All Mod. | \$10.00 |
| E. M. F.        | 30       | 15.00   |
| American        | 30       | 20.00   |
| American        | 34       | 21.00   |
| American        | 56       | 22.00   |
| Krit            | All Mod. | 18.00   |
| Nyberg          | 4-Cy.    | 20.00   |
| Nyberg          | 6-Cy.    | 22.00   |
| Westcott        | 6-Cy.    | 20.00   |
| Stoddard-Dayton | All Mod. | 20.00   |

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500 Prospect Ave. Cleveland, Ohio  
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## RADIATOR BARGAINS

|                                       |         |
|---------------------------------------|---------|
| Ford Model T Tubular.....             | \$16.00 |
| Ford Model T Honeycomb, V-shaped..... | 25.00   |
| Buick 16 and 17.....                  | 28.50   |
| Buick 10.....                         | 20.00   |
| Hudson 20, 32 and 33.....             | 28.50   |
| Chalmers 30.....                      | 30.00   |
| Everett 30 tubular.....               | 14.00   |

Write for prices on any other makes  
**AUTOMOBILE APPLIANCE CO.**  
1436-38 So. Michigan Ave. Chicago, Ill.

## RADIATORS

### NEW GUARANTEED

|                     | Tubular. | Honeycomb. |
|---------------------|----------|------------|
| Ford T.....         | \$17.00  | \$19.50    |
| Buick 10.....       | 19.75    | 22.50      |
| Hudsons, 20-33..... | 29.00    | 29.00      |
| Overlands.....      | 31.00    | 33.00      |

We have radiators, both tubular and honeycomb, to fit any car. Write us for prices before buying. Send in your old radiator for repairs. We are experts. We'll make allowances on your old radiator.

## WORLD'S LARGEST DEALERS

in automobiles and accessories. Send for the great  
**PRICE WRECKER**

the money saver, covering everything pertaining to an auto.

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to charge from A-C circuit 1 to 8 ignition, lighting or starting batteries at one time; \$12 and upwards. **AMERICAN BATTERY CO.**  
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The Utility Auto Lock will protect your car, robes and radiator cover. The cost is small. Positive protection.

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Ship that troublesome Carburetor by Parcel Post. We rebuild and install new parts. Factory testing methods used. Service station for Schebler and Rayfield. All work guaranteed.

**WILLS CARBURETOR SPECIALIST**  
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Motor car owners are demanding that their cylinders be reground and fitted with new pistons and rings. Are you in a position to accommodate them? If not, attach an Acme Cylinder Grinder to your lathe and get this business. There is money in it for you.

We also regrind cylinders and fit them with new pistons and rings. Liberal discounts to you on this work.

## Acme Grinder Company

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**TWENTY-FIVE HIGH GRADE COUPE BODIES** for quick delivery. Write for prices, blue prints and specifications.

**IRVIN ROBBINS & CO.**  
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## \$5.00 HOOD COVERS FOR FORDS \$2.50 DELIVERED

Detroit's Oldest Department Store offers an exceptional bargain in Hood and Radiator Covers for Ford Cars. Made of very best material, heavy thick quilting. We will send one prepaid for \$2.50, and if it is not the equal of any \$5.00 cover, you may return it at our expense. Dealers, send \$2.50 for sample, then get our dozen proposition.

**Heyns Bazaar** Detroit, Mich.

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AS GOOD AS NEW. FOR SHOP USE.  
A GREAT BARGAIN

**Vanderpool's, Springfield, Ohio**

## We Tear 'Em Up and Sell the Pieces

We can save you money on Repair Parts or Supplies for your Auto

Can supply you with Crank Cases, Crank Shafts, Cam Shafts, Cylinders, Pistons, Connecting Rods, Radiators, Gears (any style), Timers, Magnetos, Coils, Carburetors, Manifolds, Water Pumps, Transmissions, Rear and Front Axles, Wheels, Steering Gears (complete), Steering Wheels, Gasoline Tanks, Wind Shields, Springs, Bodies, Seats and Cushions, Jacks, Tires and Tubes, Head Lamps, Side Lamps and Tail Lamps (any style), Prest-O-Lite and Search Light Tanks, Horns, Mufflers—in fact, any part of an auto.

We also buy old autos—condition no object—or any part of an auto, or if you want to trade parts we will trade with you.

OUR GUARANTEE TO ALL—IF NOT SATISFIED WITH YOUR BARGAIN, RETURN AND WE WILL REFUND YOUR MONEY.

## SPECIAL BARGAINS

|  |         |
|--|---------|
| New Ford Wheels, 30x3.....                 | \$ 2.00 |
| Rain Vision Wind Shields, brass finish.... | 10.00   |
| Electric Horns with cord and push button   | 2.50    |
| Umph Timer, 2 and 4 cyl., new.....         | 2.00    |
| Splitdorf Magnetos.....                    | 15.00   |
| Mercedes Type Radiators.....               | 12.50   |
| Electric Tail Lamps.....                   | 1.25    |
| Comb. Trunk and Tire Holder.....           | 1.50    |
| Crank Shaft, Mod. T Ford.....              | 5.00    |

## Motors

We carry a large line of 2, 4 and 6 cyl. motors in stock. Send for list of same

## AUTO WRECKING CO.

Old Church, 13th and Oak  
KANSAS CITY, MO.

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## RADIATOR AND LAMP REPAIRING

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Any make repaired and returned same day. Radiators to fit any car shipped in three days. New cores replaced in any make radiator. All work fully guaranteed. **SHEPPARD CO., 1331 W. Jackson Blvd., Chicago, Ill.**



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Oxy-Acetylene Welding  
of cracked cylinders a specialty.

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Lee W. Oldfield

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### AGENTS WANTED

To solicit Nickel Plating of Automobiles, etc. Big commissions.

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Broken crankshaft, crank cases, cylinders, flywheels, gear teeth, pistons, perfectly welded and machined, ready to replace; scored cylinders made new; booklet. **Atlas Welding Company**, 44 Elizabeth Ave., Rahway, N. J.

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We absolutely guarantee all work done by the **OXWELD PROCESS** of welding and cutting, including welding cracked or defective cylinders, crankshafts, housings, aluminum crank and transmission cases, etc., etc. Estimates furnished on job and contract welding and cutting of all kinds.

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**Oxy-Acetylene Welding Automobile and Machinery Parts**  
**WELDED AND MACHINED**  
Cracked Cylinders a Specialty  
**ADAPT MACHINERY CO.**  
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**FOR SALE—TWO 20-PASSENGER BUSES** made by the White Co., Cleveland, Ohio, suitable for cross-country, or any kind of passenger service. Address Box E266, c/o Motor Age.

**OVERLAND ROADSTER; MUST BE SOLD** before January 15; newly painted; excellent condition; demonstration at Marlon Garage, 60th & Ludlow, or 6124 Ludlow. **C. J. La Fleur, Philadelphia, Pa.**

**\$300.00 SAVED ON "1915 CHALMERS MASTER SIX."** This car is absolutely new and completely equipped just as shown in manufacturer's advertisement, and has not yet left the factory. Urgent need of funds compels me to sacrifice this car for \$2,100.00 f. o. b. Detroit. **H. P. Allen, Box 76, Ft. Wayne, Ind.**

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### WANTED

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**STORAGE BATTERY SALES ENGINEER.** Wide acquaintance among the trade. Starting and Lighting Batteries my specialty. Am also Service expert. Address Box E 268, care Motor Age.

**WANTED—POSITION, BY COMPETENT** driver as chauffeur, with party going to exposition; four years' experience; good references. **W. C. Romine, Downs, Ill.**

**WANTED—SITUATION BY TRAVELING** automobile salesman with several years' road experience, representing automobile manufacturers; temperate, splendid driver, mechanic and demonstrator; good personality and willing to work, and am thoroughly familiar with all branches of the business. Write at once for particulars. Address Box E 269, care Motor Age.

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**WANTED—SALESMAN ACQUAINTED** with automobile trade to represent a large factory making special stampings and sheet metal articles and parts on contract; must have experience in this line and must have knowledge of the mechanical end of the business, so as to be able to discuss requirements with prospective buyers intelligently; state experience and salary expected. Address Box E 270, care Motor Age.

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**BEST POSSIBLE BUSINESS OPENING IN** automobile business. Have been established in same location ten years; garage 110x150, no posts; all up-to-date shop equipment, large storage business; reason for selling have other business which takes me out of city part of time. We are located in city of over 300,000 inhabitants and have agency for one of the most popular cars on the market, with large territory in most prosperous part of the U. S. Would retain interest with high-grade man if desired. Do not overlook this opportunity; will make appointment at Chicago show if interested. Address Box E264, c/o Motor Age.

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## Last forms for the January 21st Chicago Show Issue of Motor Age

**Close Mon. Noon, Jan. 18**

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Get in touch with us now.

## MOTOR AGE

910 S. Michigan Ave. Chicago





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This Free Book Means Bigger Profits to Every Garage.

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It shows how you can secure a complete, tried and tested outfit at moderate cost that will pay for itself in a short time.

The outfit described is automatic—requires no attendant.

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This free book contains information too important for you to miss. Take the time right now to send in your name and address to—

### The Esterline Company

223 E. South St.

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*The Easiest Selling Line of Motor Trucks in America*

3/4-ton with express body, internal gear drive.....\$ 995.00  
1-ton chassis..... 1350.00  
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| Stromberg Carburetor | Standard Cone Clutch  |
|                      | Firestone Tires       |

### No Better Units Built

We ask the opportunity to prove our statements. Wire or write for catalog and complete information.

### Republic Motor Truck Co., Alma, Mich.

FORMERLY ALMA MOTOR TRUCK CO.

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## THE CORBIN-BROWN SPEEDOMETER

"The Speedometer of Absolute Accuracy"

Two factors account for the widespread popularity of the Corbin-Brown—the actual performance of the instrument itself and the reputation of the company behind it.

For forty years Corbin products have set the standard by which the trade has measured quality. For forty years consumers have been familiar with the name of the house, familiar with its high manufacturing ideals, familiar with its numerous products—to them the name Corbin stamped on a product is a guarantee of efficient workmanship and high quality material.

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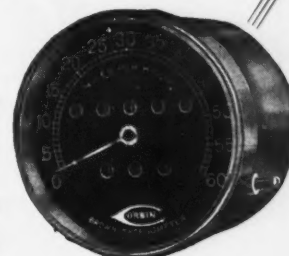
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The American Hardware Corporation, Successors  
New Britain, Conn.

BRANCHES: New York Chicago Philadelphia

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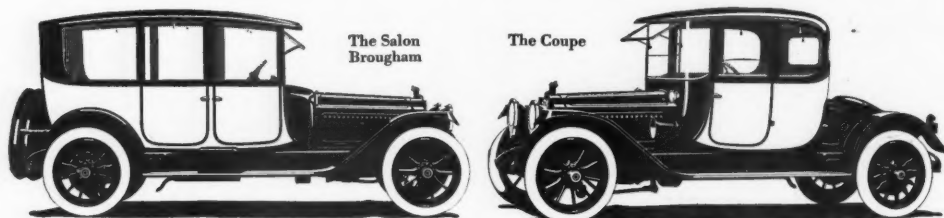
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## *Packard*

### 3-38 AND 5-48

MADE IN AMERICA



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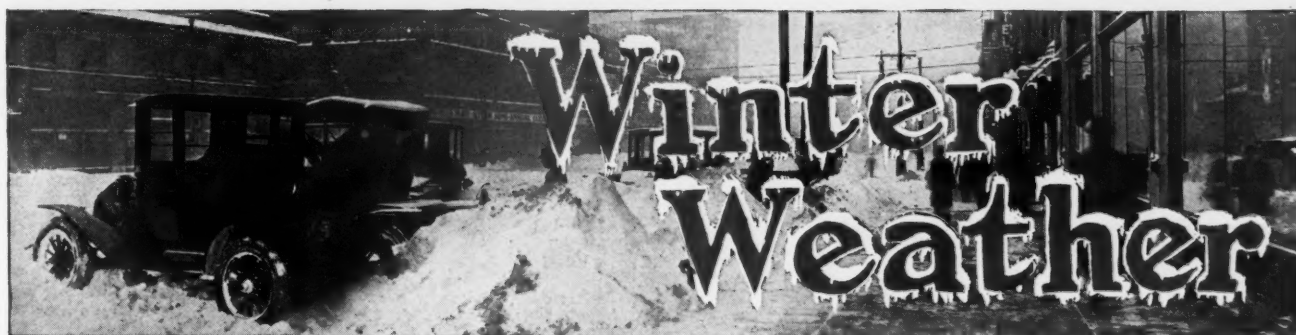
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*Ask the man who owns one*

PACKARD MOTOR CAR COMPANY

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Over 300,000 Automobiles  
and Motor Boats*



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